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Monthly Message

During World War I the British backed Husein Grand Sherif of Mecca in the revolt of the Arabs from Turkish rule with the intent eventually to form an Arab state or confederation T E Lawrence Oxford graduate and archeologist had lived for many years in the Near East With the backing of Sir A H McMahon High Commissioner in Egypt and Sir Ronald Storrs Military Governor of Jerusalem he joined with the Arab armies under the sons of Husein These armies contributed in large measure to the final triumph in the Near East

In Lawrence s *Seven Pillars of Wisdom* written a few years after the war the following extraordinary paragraph appears in the early pages

> Arabs c uld be swu g on an id as on a cord for the unpledged allegiance of their minds made th m bedient se va ts None of them would escape the bond till success had come and with t responsibility nd duty and engag m nt Then the idea was gone and the work ended— n ru ns W thout a re d they could be taken to the four corners f the world (but not to he ven) by being shown the iches of e rth and the plea u e of it but if on the road led in this f shion they met th p phet f an idea who had nowhere to lay h head and who d pended for hi food on charity or b rds then they would all leave their wealth for his inspiration They we e incorrigibly children of the dea feckless and colour bl nd to whom body and sp t w e f r ver nd in vitably op posed Their mind w s str nge and dark f ll of dep e sions nd exaltations lack g in rul but w th more of ardour a d more fertile in belief than ny oth r in the world Th y w re a people of st rts for whom the abstract w s the strongest m tive the process of inf nite courage and var ty nd the end nothing They were as unstable a water nd like w te would pe haps finally prevail Since the dawn of lif in success e waves they had been d sh ng themselve g nst the co sts of flesh Each wa e w s broken but like the a wo way eve so little of the gran te on wh ch it fa led and ome day ges yet might roll unchecked over the pl ce where the mate ial world had been nd God would move upon the face of tho e waters One such wav (nd not the least) I rais d and rolled before the b eath of n id till t e ched its cre t and toppled over nd fell at D ma cus The w sh of that wave thrown b ck by the resi tance of t d th ng w ll provide the m tt r of th foll wing wave wh n f ll e of tim th hall be raised o ce m re

Frank B Berry

FRANK B BERRY M D
A s st nt S cretary of Defense
(H alth and Medical)

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FRANK B BERRY M D
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SEVERE DYSBARISM IN ACTUAL AND SIMULATED FLIGHT

A Follow Up Study of Five Cases

CHARLES A BERRY *Major USAF (MC)*
ARTHUR H KING *Captain USAF (MC)*

DYSBARISM lurks as a constant potential hazard in all high altitude flight This complex of symptoms resulting from exposure to decreased or changing barometric pressure may have severe manifestations at altitudes as low as 22 000 feet Severe cases may result from exposure to actual altitude in flight or to simulated altitude in the low pressure chamber Several such cases were reported previously by one of us [1] In spite of magnificent engineering advancements, many of our aircrews continue to be exposed to cabin altitudes in excess of 20 000 feet

In previous reports[2,3] the source of the chamber reactor reports was discussed and the lack of a comprehensive reporting system for in flight dysbarism incidents was deplored Steps have been taken to remedy this situation The need for a follow up study and a proposed outline of such a study were also discussed Recently, we had the opportunity to conduct follow up examinations on two in flight and three chamber dysbarism cases The presentation of the pertinent details of the original dysbarism incidents and the follow up examinations is the purpose of this paper

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From the USAF School of Aviation Medicine Randolph Air Force Base Texas Presented at the Third European Congress of Aviation Medicine Liege Belgium 23 27 September 1958

CASE REPORTS

Case 1 This 33 year old officer participated in a chamber flight in March 1954 He was moderately obese 72 inches tall and weighed 195 pounds The chamber was decompressed at a rate of 1 000 to 3 000 feet per minute He was on 100 per cent oxygen from ground level He noted pain in the abdomen at 35 000 feet and attempted to relieve it by belching and passing flatus This pain was not severe and ascent continued to 43 000 feet Thirty seconds after reaching 43 000 feet the officer placed his hand to his forehead to indicate dizziness or discomfort then rubbed his shoulders to indicate pain The chamber altitude was immediately dropped (simulated free-fall) and at 30 000 feet the patient lost consciousness and urinated involuntarily The oxygen regulator was then turned to the emergency setting The chamber reached ground level in less than four minutes and the officer was semicomatose He was immediately placed on a stretcher continued on 100 per cent oxygen and taken to the recovery room

He complained of dizziness twitching of the eyelids numbness of both arms (particularly the elbows) mild generalized cephalgia and blurring of vision His blood pressure was recorded at 150/80 mm Hg and nystagmoid eye movements coolmoist skin and hyperesthesia of the forearms were present Dextran was started intravenously After observation for an hour in the recovery room the patient was moved by litter to the hospital ward During the movement the patient became pale began to sweat profusely and vomited clear material His pusle became more rapid and weak

On admission to the hospital the patient's blood pressure was unobtainable his pulse was weak with a rate of 150 per minute respiration were 40 per minute and shallow the skin was cold and moist and marked pallor was evident Conventional shock therapy was instituted Two and one half hours after admission to the hospital the patient's blood pressure stabilized at 120/70 mm Hg his pulse was 96 and his respiratory rate was 16 per minute He complained of dizziness faint headache blurred vision and paresthesia of both forearms Examination revealed bilateral nystagmus diminished corneal reflexes and sluggish pupillary reaction to light The abdomen was moderately distended but peristalsis was normal Six hours after admission the patient became extremely restless and confused and a lumbar puncture was performed Initial pressure was 760 mm of water Twelve ml of purulent fluid was slowly removed Closing pressure was 140 mm of water The spinal fluid was clear with 17 cells (7 polymorphonucleocytes and 10 lymphocytes) sugar was 36 mg chloride 715 mg and total protein 98 7 mg all per 100 ml Following lumbar puncture the patient developed carpopedal spasm and rapid respiration and lapsed into a restless coma

Approximately 24 hours after admission to the hospital signs of right hemiparesis appeared and the patient gradually developed fixed pupils absent corneal reflexes Cheyne Stokes respiration loss of abdominal and cremaster reflexes and strong Babinski Chaddock and Oppenheim signs on the right Signs of possible tracheal obstruction

due to tenacious secretions became apparent and a tracheotomy was performed 31 hours after the onset of neurocirculatory collapse Following this procedure the patient s respirations became regular Five days later the neurologic examination findings were within normal limits Treatment after the acute phase consisted mainly in supportive care and the patient remained in the hospital until the tracheotomy incision was closed Laboratory studies are summarized in table 1

Twenty four days following the incident the patient was discharged to duty and four days later returned to flying status Since his return to flying status this officer has been flying in conventional type air craft and has never exceeded an actual altitude of 20 000 feet

He was re examined at the School of Aviation Medicine in 1958 Complete neurologic psychiatric psychologic and physical examinations were entirely within normal limits except that the patient was obese and appeared older than his stated age

Case 2 This 37 year old officer is a command pilot with 4 376 hours of military flying time 315 hours of which have been flown in jet aircraft predominantly in the B 47 and B 52

In June 1943 he experienced an episode of dysbarism in the altitude chamber At that time he was 23 years of age and was in fairly good physical condition being 69 inches in height and weighing 170 pounds As the altitude approached 38 000 feet during the chamber flight he noted numbness in his right arm Seconds later the arm became uncontrollable and he described it as flying out to the extended position Immediate descent was initiated and during descent he became unconscious He was admitted to the hospital where neurologic examination revealed a right hemiparesis Approximately 48 hours later the patient regained consciousness with complete resolution of the hemiparesis He remained in the hospital for five days and then went on 30 day convalescent leave Following his return from leave he was given a complete physical examination and all findings were within normal limits

Since 1943 he had accumulated at least 12 hours of flying at a cabin altitude above 30 000 feet In February 1958 while he was flying in a B 52 cabin pressure could not be maintained and he flew for one hour at a cabin altitude of approximately 33 000 to 35 000 feet and experienced no difficulties During this same time interval he had participated in four routine physiologic training flights without untoward incident

On the morning of 11 July 1958 however this officer entered the chamber for the purpose of another routine flight He was taken to 8 000 feet and returned to 1 500 feet for an ear check No difficulties were encountered and with the oxygen regulator set on the normal setting he was taken to an altitude of 43 000 feet in 25 minutes This altitude was maintained for one and one half minutes and positive pressure breathing was performed The altitude was then decreased to 35 000 feet and maintained for 5 minutes The altitude was then further decreased to 30 000 feet and the patient removed his oxygen

TABLE 1 S m ry f l b at y d f dy b m

	T f d						
	I l	4 h	12 h ur	0 h ur	24 h	48 h ur	72 h ur
I							
WI				20 000	16 000	12 C00	
RI			5 600 000	4 900 000		3 900 000	
fl	15 C		16 3	14 8	14 8	14 5	
H T	54			49	46		
l	pe f h h d			p f R y 1 040 R			
	lb R						
C 2							
WBC	C 850	14 450			13 C00		7 000
RI C		5 820 000					
Hb	17 1	17 6			18 2		13
HCT	3				58		44
U	R R R lb R			p f R y 1 020 R R R lb m			
C 5							
WBC	4 C00				29 000		
RBC	7 250 000						
Hb	21 4				16 7		
HCT	71				54		
U					lb 2 R		
					hy l 10-15 d bl d ll 5 10 h bl od ll		

ll l b p 100 l
l oc l 100 l

mask to participate in a hypoxia demonstration Almost immediately he noted difficulty in writing numbers and his oxygen mask was replaced after 30 seconds He remained at this altitude while one half of the group continued with the hypoxia demonstration At this time he experienced mild pain in his right elbow He insisted that this pain was not serious enough to cause his removal from the chamber Several times the inside observer questioned him concerning the pain but no progression was reported It was noted that the subject's color and respirations were normal He was alert and responsive but as normal descent was about to begin he suddenly indicated an urgent desire to descend. He stated that the pain in his right elbow had not subsided and that he had developed an odd sensation requiring that he reach ground level as soon as possible As descent started the inside observer connected the patient to a portable oxygen bottle to permit him to be removed to the chamber lock at which time the patient became unconscious and emergency descent was accomplished The patient denies being unconscious and states that he remembers everything that was said and was well aware of his surroundings but that he lost complete muscular control and could not move The inside observer noted obvious ocular deviation during descent

Upon reaching ground level the patient was in a state of complete helplessness and was carried to the recovery room The pain in the right elbow had disappeared upon recompression Blood pressure taken immediately in the recovery room was recorded as 90/46 mm Hg respirations 28 per minute pulse 80 per minute strong and regular and remained stable The officer's skin was pale cold and clammy He however was alert mentally and in contact with his surroundings Funduscopic examination revealed moderate pallor of the optic disks Complete neurologic examination revealed a hyperactive patellar reflex on the right and a positive Oppenheimer on the left The medial surface of the left leg was hyperesthetic to pinprick. Electrocardiographic tracings 20 minutes after removal from the chamber were within normal limits The patient stated that while lying on the table in the recovery room he noticed that the yellow light in the ceiling seemed to be going around in circles for some 10 minutes During this time he also noted that he had difficulty in focusing on an distant object The object would come in to focus and then gradually fade Blood pressure recorded during the first 20 minutes in the recovery room was 100/62 mm Hg and then stabilized at 112/84 mm Hg

The patient was then admitted to the hospital where oxygen was administered and 1 000 ml of 5 per cent dextrose in saline solution was started intravenously He was given 15 mg of Pyramine Sulfate (brand of morphine sulfate) intramuscularly He responded immediately with a sustained rise in blood pressure and marked clinical recovery from his state of shock Four hours after admission the oxygen was discontinued and approximately 6 hours after admission intravenous fluids were terminated The following morning he was asymptomatic and was allowed out of bed Serial electrocardiograms and roentgenograms of the chest were normal Complete neurologic examination

findings were within normal limits at this time and he was discharged 72 hours after admission Labo tory studies are summarized in table 1

This patient had adequate sleep the night before and there was no history of fatty food intake p ior to his chamber flight No alcoholic beverages we e ingested fo 24 hours preceding the chamber flight His weight was recorded as 191 pounds nd his height as 71 ½ inches

Follow up examin tion in August 1958 reve led a well developed man with a receding hairline He appeared pproximately 10 years older than h stated age of 38 He was moderately obese weighing 171 pounds

Phy ical and neuropsychiatric examination findings including electroenceph l graph c traci gs we e within normal limit except that while he w s breathing 7 per cent oxygen his electr encephalogram showed a lower toler nce to hypoxia than th t usually seen Ancillary laboratory studies including l ver function te ts were with n normal limits

Cas 3 This 37 y r old officer with over 2 000 hours of flying time in con e tional type irc ft participat d in a routine ltitude chamber flight on 19 October 1956 Prior to hi chamb r flight he was noted to be apprehensi e He ntered the chamber was placed on 100 per cent oxyg n and without a per od of denitrogen t on at ground l vel was d c mpres d at the rate of 2 000 to 3 000 feet p r minute At 34 000 feet he became aware of a tingl ng sensation in the skin of his chest The oxygen egulat wa then placed on the s fety set ting He was breathing rapidly and was told to slow his bre thing rate The chamber alt tude was taken to 42 000 feet and then returned to 30 000 At 30 000 fe t a hypoxia demonstrat on was performed but the pat ent d d not participate At this time he was hyperventilating (35 respirations per minute) H appeared pale w s swe ting profusely and described the pre nce of do ble vi ion and a feeling of dizziness He att ibuted his rapid breath ng to a feeling of suffocation He stated h s s nses were dull and although he could he r h could not see and was losing the bil ty to use his extremities It was decided to evacuate him f om the chamb As he stood up he howed definite signs of muscular n-co rdination m nifested by short faltering steps He wa mm diately brought to ground level at which time t was noted th t his rapid breathing had subsid d He was seen by the flight urgeo who corded hi blood pressure as 110/80 mm Hg and his pul e rat a 84 He was placed on a stretcher and taken to the hosp t l

Whil being m ed to the hospital he descr b d a subjective feeling of falling off th left s de of the stretcher Shortly fter reach ng the hosp tal he developed nausea and violent vomiting frontal and oc cipital headа h s and tiff ess a d soreness in the left side of his neck and h s left sh ulder Examination revealed a well dev loped well nourished man 72 n hes tall weighing 170 pounds who was not unconscious but re ponded sluggishly to q stions and nstruct ons

and appeared very weak Physical and superficial neurologic examinations were essentially negative except that there was some suggestion that when the patient was looking toward his right eye deviated slightly to the right His semistuporous condition prevented a neurologic examination for cerebellar dysfunction Initial laboratory work revealed a white blood cell count of 20 600 per µl with 89 per cent neutrophils 10 per cent lymphocytes and 1 per cent monocytes Hemoglobin was 14 4 grams per 100 ml sedimentation rate was 9 mm per hour Urinalysis was entirely negative with a specific gravity of 1 028

Following admission to the hospital the patient continued to complain of a severe headache which persisted for approximately 24 hours He moaned and thrashed about in his bed took fluids poorly had slurred speech and appeared very confused at times although with sufficient probing appropriate responses could be elicited Four and one half hours after admission a lumbar puncture revealed clear spinal fluid at a pressure of 260 mm of water and normal fluid dynamics Sixteen hours after admission to the hospital he was placed in an oxygen tent and 1 000 ml of 5 per cent dextrose in water was started intravenously In 24 hours he appeared much more oriented but would follow instructions in a sluggish manner A complete neurologic examination at this time revealed dysdiadochokinesia of the left hand, in-co-ordination on the left finger-nose test a tendency to fall to the left on walking slurring of speech and involuntary movement of the left wrist best described as athetoid in character He remained in an oxygen tent for approximately 36 hours and received intravenous fluids consisting of 10 per cent dextrose in water

By the morning of the fourth hospital day the patient was sufficiently improved to get out of bed and walk around He was fully oriented and complained only of pain at the back of his neck. The patient continued to improve and was discharged from the hospital on the sixth day following his chamber reaction Neurologic examination at the time of discharge revealed marked improvement in co-ordination of the left hand however there was still evidence of some in-co-ordination of the finger-to-thumb test The slurring of speech which was noted on admission was relatively unchanged

An electrocardiogram 12 hours after admission revealed T waves to be low in all standard leads and unipolar limb leads Diasphasic T waves were noted throughout the chest leads An electrocardiogram four days later revealed the T waves to be upright and the tracing was considered entirely within normal limits

One month later this patient was evaluated at this school Electroencephalograms and roentgenograms of the skull were negative Neurologic examination revealed decreased co-ordinated movement of the right arm dysdiadochokinesia mild spasticity and weak rebound phenomenon in the left arm and instability while standing on the left foot with eyes closed

The dysmetria in the left finger-nose test was not sufficiently great to be considered abnormal and there was no evidence of slurred speech

at th s time Anc llary laboratory tudie we e unremarkable except for a leukocyte count of 22 500 per μl with a normal different al An elect oca d o_gram was with n normal l mits Ear no e a d throat xami nat on in lud ng vestibular funct on r v aled no abnorm lities An phthalmologic l ex min tion f nd ngs were w th n no mal lim t except for a borderl ne colo vis n defic ency Clin cal p ychologic a d medical status xamin tion vealed no ev denc f impaired functi n ing on an organic ba Fi months after the o ginal p ode this patient wa re valu t d t th chool A peat neurolog c evaluation wa entir ly w th n normal lim ts w th compl t di appear nce of prev ou ly abnormal f nding Ancilla y l bor tory studies r vealed a persi tent l ukocytosis Bone marrow d ff nt al revealed norm l dist ibution of c ll bel ging to the g anulocyt c and erythrocytic s ries The pati nt el vated whit blood cell count was thought to repre nt diop th c leukocyto s

Ca e 4 Thi 35 year old senior p l t h s 3 290 h u of milit ry flyi g t me in onv nt on l typ ai c ft and 10 hour in th T 33 He was part cip ti g n towing m ssion in th back seat of a T 33 on 20 March 1958 About 25 minutes after take off an ltitude of 35 000 f et was r ched (th cab n alt tude w 26 000 feet) At thi time th pat ent b gan to experien e pa n n th ight low co t l area He thought that thi p obably was d e to ga and made no mention of t Th plan cont nued to climb to 37 000 f t where th m s on w to b accompl h d H th n ti d p n in the l ft ant rio ax llary f ld and bove th l ft knee and the r ght elbow Th s pa n was not n the jo nt At thi po nt the pat ent began to exper ence t ngli g n the arm and h nd He thought h might be hypox c and w tched to 100 p r c nt oxygen He then took a de p bre th and w th n a few seco ds d lop d a severe dry h king cough Th pilot h ving been n tifi d f the patient s difficulty descended to 30 000 f t Th r pir t ry diff culty subsid d although the p in n the ar ous a eas pers sted Further d ent to 13 000 feet was ccomp l shed with eli f of all symptoms Altog the the patient est mates that they w t 37 000 f et f 15 to 20 minute 30 000 f et fo 10 to 15 m nut nd 13 000 f et fo another 15 min tes Aft r land ng he t d th t he f lt u usu lly tired and the e was som r sidual n s n th ar wh r th p in had been He was not hosp t lized nd no labo atory tud es were perform d

Th foll wing mo ng at app ox mat ly 1100 hour th pat ent noted prur t niv l k red pl tch n the s me a eas whe e he h d p ev o ly xp enced pa n The splotche tarted to di pp ar n the ft noo nd by h next day wer entir ly go e

This off h d m d nly f ve prev ous jet flights and th e fl ghts w re t o e 30 000 fe t He only h b n the altitude ch mber twice dur ng his fly g c th fir t during cadet tr in g in 1941 and the c d o and e h lf year ago dur g which he exp r enc d p in n h s l ft should jo t 33 000 feet

A rev ew f th s p t d et ry a d sleep h bit p or to his T 33 flight re ealed gn f cant f tures H s lunch o s ted of h m

burger and pie ala mode There is no history of alcohol intake in the preceding 24 hours

Complete neuropsychiatric examination including roentgenograms of the skull and an electroencephalogram was within normal limits Physical examination revealed a well developed man with a receding hairline and appearing 10 to 15 years older than his stated age of 35 He was moderately obese and flabby He was 71 ½ inches tall and weighed 183 1/4 pounds The rest of the physical examination findings were entirely negative except for a marked dermographia Laboratory studies including liver function tests were within normal limits except for a moderate elevation of the serum cholesterol serum phospholipids and serum lipid protein fractions as follows cholesterol total 334 mg per 100 ml S_f 0 12 class 412 S_f 12 20 class 96 S_f 20 400 class 420 Atherogenic index (AI) is 132 Cholesterol 364 mg per 100 ml Phospholipids 13 9 mg per 100 ml

Case 5 This 46 year old civilian flew as a passenger in the rear seat of a T 33 jet aircraft on 29 April 1956 He previously had participated in an altitude chamber indoctrination in February 1956 Prior to take-off he was briefed on the use of the oxygen equipment He had eaten a normal breakfast but had omitted his noon meal The oxygen regulator was set on "normal and take off was accomplished at 1530 hours An altitude of 40 000 feet (cabin altitude 31 000 feet) was reached in 30 minutes and the aircraft assumed level flight The pilot checked his passenger by questioning him over the intercom about every 5 minutes and received normal replies About one hour after take off the passenger stated that he did not feel well and complained of a dull aching pain in his left knee About 15 minutes later there was tingling and numbness in his fingers The pilot instructed him to switch to 100 per cent oxygen The passenger acknowledged this instruction but when asked if he had switched he said "No He was firmly instructed several times to switch to 100 per cent oxygen but each time when asked if he had switched he would say no The patient remembers this episode and states that he had an I don t care feeling

In view of the passenger s peculiar behavior the pilot decided to descend to 20 000 feet (cabin altitude 13 000 feet) and when a lower level was reached the passenger switched the setting on the oxygen regulator to 100 per cent oxygen and 41 000 feet He switched to the positive pressure setting because he thought he was having difficulty breathing and that it was easier with the positive pressure The passenger then said he felt all right and it was decided to continue the trip The aircraft ascended to 40 000 feet and the passenger experienced no further symptoms except that he felt anxious during the remainder of the flight After landing at 1655 hours the passenger complained that he felt quite fatigued and had difficulty buttoning his shirt He then accompanied the pilot to the pilot s home where he complained of feeling weak and faint He felt better after lying down but vomited liquids which were given to him He was then transported to the hospital where he fainted twice in the admitting room but quickly regained consciousness after each episode of fainting

Initial examination 6 hours after landing reveal d a pale stocky well nourished well developed man we ghi g 183 pounds and meas uring 67 inches in height He was alert well oriented co-operative and said that he f lt better in a supine position His pulse w s 108 blood p essure 102/88 mm Hg rectal temperature 100 2 F respirations 18 per minute slow and deep Positive find ngs on physical exami nation were a cool moist skin low blood pressure and distant he rt sounds Careful neurologic examinat on findings nd eye grounds were normal The patient was immediately placed n an oxygen tent and was slowly given 2 000 ml of dextrose in dist lled water Labo tory studies are summariz d i table 1

Electrocardiographic find ngs were normal except for sinus tachy cardia of 125 Approximately three hours following dmission the pa tient w nt into complete circulatory collapse His pulse was rapid weak and th e dy nd systolic blood pressure was 50 to 80 He was n useated and vom ted on s veral occas ons E ght milliliters of Levophed (brand of l rep n phrine) was instilled i the nfusion because the blood pres ure became unobtainable During the first 24 hours the patient received a tot l of 4 690 ml of flu d including 500 ml of dext an Duri g this t m 45 ml of urin wa excreted and 720 ml of blood stained vom tus was regurgitat d The pat ent also was per spi ng profusely A lumbar puncture revealed normal flu d dyn mic with an opening pressur of 140 mm of wate Neu log c ex mi tion find ng at this time were within norm l l mits The blood pr sure g adually returned to normal (110/76 mm Hg) and the pat ent imp oved markedly Dur ng the s cond 24 hou s the hem tocr t fell to 54 ml p r 100 ml hemoglobin wa 16 7 g m per 100 ml and th white blood cell count was 29 050 per μl H rece ved a total of 5 000 ml of flu d by mouth nd ve n during the second day and was plac d on prophyl ctic penicill n and streptomycin sulfat Ur nary output ncreased after recovery from shock and hemoconcentr tion and urin ry outp t w ove 5 000 ml the second d y The pati nt cont nued to improve and by the th rd day he had recovered entir ly exc pt f r a corrected erythro cyte sedimentat on rate of 25 mm per hour

Ur n lys s (cathet r zed specimen) 18 hours after admission showed 2+ alb min trace of sugar positive acetone 2 hyaline c sts 10 to 15 ed blo d cells and 5 to 10 white blood cells per high pow ered field Blood chemi try studies in the first 24 hours revealed urea nitrogen 30 5 mg per 100 ml carbon d ox de 47 volumes per ce t serum od um 137 mEq per liter nd pot sium 4 5 mEq per liter

Se i l electrocardiogr phi tracings r vealed some ch nge in the T wav of the chest leads from an initial low positiv to d ph sic a d then to in erted T wave S T segments became elev ted in leads I II III aVF and depressed in aVR These ECG ch nges gradually returned to n rm l w thin 7 days

This par nt has not been e posed to n altitude of over 20 000 feet since hi g nal p sode Two yea s and 4 months later a follow up examinati which cluded a complete physical examin tion neuro logic e ami at on lect oe cephalogr m electrocardi gr m and visual

TABLE 2 S mm y f tl f d gs f f dysb r m

C	Ag	F ll w p t l	Typ f d t	R cl f c t	Alt t d (f t)	Tim lt t d	H	Wt	S g f t f d gs	
									Initi l p d	F ll p
1	33	4 y	Ch mb	N ur c l t y	43	5 m	72	195	G p d z l f c c bl d v p th h k ght h m p s h t my	M d t b ty App r d ld th g
2	( )23 (b)37	( )15 y (b)1 m h	Ch mb Ch mbe	( ) & (b) N ur l t ry	( )38 (b)43 30	( )4 5 m (b)21 m	69 69	170 185	( ) P th ct ght h m p e (b) B d s h ck u l and fle ch g	App s 10 y s ld th g Obe e D s d hyp t l n h wn EFG
3	37	( )1 m h (b)5 m h	Ch mb	N ur l g l	42 30	12 m	72	170	S m t g l d p ch dy d do h k p t R mb rg s lunt y m m ts f l ft h d bn m l ECG	( ) D d -o d t n m v m t ght m Dy h d ch k n l ft m l t b l ty t d g l ft f t (b) N m l
4	35	2 m th	I fl gh	N ur c c l t y	29	20 m	71	183	B d h k f t g e k ct o del y d	M d t b ty App ld th g Fl t d m l p d D m g ph
5	46	2 y 4 m th	I fl gh	C r l t y	31	30 m	67	183	V m t l f h k bn mal ECG	Ob

fields was within normal limits Th re was no evidence of any resid following th s severe episode of dysbarism

DISCUSSION

The significant details of these cases are summarized in table 2 The altitude given is the peak altitude attained In the case of inflight incidents the altitude is cabin altitude as contrasted to ambient altitude *When the reaction occurred at an altitude* lower than the peak altitude reached the peak altitude is followed by the altitude at which the reaction occurred

With the exception of the initial reaction of patient 2 and patient 5 all cases occurred when the patients were in their thirties An increased incidence with age has been reported by many authors This has been shown to be significant in even as small an age band as 18 28 years

The follow up interval varies from 1 month to 15 years Surveys of the literature reveal a remarkable lack of follow up information on dysbarism cases The cases reported here represent the initial effort in a continuin program of follow up studies

Three of these incidents occurred in altitude chambers and two in aircraft Both in flight cases occurred in T 33 aircraft Difficulty in maintainin cabin pressurization below 50 000 feet in such aircraft has been previously reported as resulting in dysbarism production

As previously reported there have been several attempts to classify severe dysbarism reactions Three of these patients exhibited both neurologic and circulatory findings one was principally neurologic and another circulatory

The altitude at which the reactions occurred varied from 20 000 to 43 000 feet In two instances reactions occurred at 30 000 after the reactors had been to a peak altitude of 43 000 feet Severe dysbarism resulting in death has been noted at cabin altitudes as low as 22 000 feet and a severe case with recovery was reported after exposure to a cabin altitude of 24 000 feet

In this and previous reports we have noted the time of exposure to altitudes in excess of 30 000 feet In view of the above reports perhaps the time over 20 000 feet should be noted The exposure times in these cases ranged from 5 to 30 minutes over 30 000 feet prior to onset of difficulty The time of exposure does not have to be prolonged 90 to 97 per cent of a large group of chamber reactors had been over 30 000 feet for 20 minutes or less before developing dysbarism [1]

The patients reported in this article confirm a generally held opinion concernin the relationship of obesity and dysbarism All but patient 3 were moderately obese at the time of the dysbarism incident and also at the time of the follow up examination In comparin the weights with those given in the weight

table used by the Air Force it was noted that all were less than their maximum allowable weight but were considered obese by the examining physicians A comparison of standard weight plus 10 per cent and weight at time of reaction shows patients 1, 2, 4, and 5 to be 5 to 16 pounds above this more realistic maximum weight

Hemoconcentration to a marked degree was noted in three of the five patients reported (table 1) It is of interest that even after intravenous fluids, hemoconcentration continued to occur Although the exact mechanism causing shock during or after exposure to decreased barometric pressure is undetermined, it is believed that the hemoconcentration which occurs is secondary to shock The leukocytosis noted can probably be best explained as a reaction to stress and shock and is not explainable by hemoconcentration alone

Of special interest is case 5 where initial blood studies made six hours after exposure to altitude revealed a hematocrit of 71 ml per 100 ml Fluids totaling 4 690 ml (including 500 ml of dextran) were administrated and 24 hours later the hematocrit was 54 ml per 100 ml

Treatment of dysbarism has always been symptomatic and early administration of intravenous fluids has been recommended Four of the five patients received fluids in varying amounts The same four also were given oxygen and one patient was given prophylactic penicillin and streptomycin sulfate In one instance 15 mg of Wyamine and in another 8 ml of Levophed were used effectively to elevate low or unobtainable blood pressure While vasoconstrictors are of value in elevating blood pressure, difficulty may be encountered in maintaining the blood pressure after their discontinuance Vasospasm seems to play a significant role in the mechanism of dysbarism and drugs which will enhance this should be used cautiously We believe the use of 5 per cent carbon dioxide as a potent cerebral vasodilator has not been fully exploited in these cases

The thorough follow up examinations were quite remarkable for their uniformity of negative findings An interesting observation on this small sample was the presence of a personality and body type in four of the five cases These patients tended to be soft spoken mild mannered, and retiring to appear older than their stated ages (manifested by receding hairlines in some), and to have remained moderately obese We were quite amazed at the similarity in appearance of these patients

Inasmuch as fat emboli and fatty livers have been noted in most fatal cases and are thought to play a role in the cause of neurocirculatory collapse, we have been interested in liver function and lipid studies Unfortunately we did not obtain these studies in all cases nor have we performed liver biopsies In

one instance, case 4 where lipid studies were done, we found an elevation The significance of this finding is unknown Lipid studies in case 2 were normal

In an earlier report[3] it was hypothesized that there would be some neurologic residua noted if a large group of severe dysbarism cases were studied at intervals after the dysbarism episode This larger study is underway but in the cases presently being reported only one patient (case 3) exhibited measurable residua On examination one month after the original dysbarism incident he had dysdiadochokinesia of the left arm decreased coordinated movement of the right arm and instability when standing on the left foot These residua had cleared however some five months after the incident To our knowledge this leaves only the case with visual field defects reported by Mebane and von Döbeln and Höök's case with paraplegia having permanent or long term dysbarism residua Höök recently reported marked improvement in his patient after a three year follow up examination revealed spasticity and weakness in both legs staggering gait and bilateral positive Babinski The patient had been returned to flying as a copilot Further follow up study of these cases is needed to determine the incidence of residua and more definitive tests for obscure residual effects would be most desirable

The question of susceptibility to dysbarism is an intriguing one During World War II numerous studies were made to attempt to pick the individuals most susceptible to decompression sickness It appears to be the concensus that selection offers little hope of eliminating this problem for there are too many factors altering susceptibility Roxburgh stated Decompression sickness is a condition to be expected in normal men and occurs without any predisposing pathology It is probable however that the great majority would be affected should the exposure be sufficiently severe We must attempt to answer the question as to whether an individual who has had one episode of severe dysbarism is more susceptible than one who has had none If the answer is no then we can look upon these episodes as accidents and figure the calculated risk If the answer is yes then steps should be taken to prevent the exposure of these individuals to altitudes in excess of 20 000 feet Though cabin pressurization is commonplace it still is not 100 per cent reliable as a means of protection Denitrogenation prior to exposure has been shown to be of definite value in protection In order to answer our question posed above we would have to re expose a large group of persons who have had severe dysbarism to altitude preferably in the low pressure chamber Would one such exposure with negative results be enough to convince the flight surgeon that the patient was no more susceptible than one not having had a dysbarism reaction? We think not Case 2 is a good example This pilot had his initial severe dysbarism episode 15 years ago In the interim

he has been exposed to altitudes in excess of 20,000 feet in the chamber on five occasions and in actual flight for approximately 12 hours None of these exposures resulted in dysbarism symptoms, still he recently again had a severe reaction Is this chance or is he more susceptible? Romano and associates[12] demonstrated increased susceptibility We need to evaluate seriously the risk of re exposing one time reactors to altitude, for we must have the courage to do so if we are to obtain a definite answer

This brings us to the disposition of such cases These flying personnel were referred to us for recommendations as to disposition It is our opinion that such disposition must be based on the answers to two questions (1) Are there any residua of the episode? (2) Is the person more susceptible to dysbarism than other pilots? The first question can usually be satisfactorily answered by thorough examination The second depends upon re exposure, and thus has not been satisfactorily answered to date In the absence of this information we can only recommend that such cases be advised to remain below altitudes of 20,000 feet

SUMMARY

Dysbarism is a constant potential hazard in all high altitude flight It may have severe manifestations at altitudes as low as 22 000 feet Follow up examinations have been conducted on three low pressure chamber and two in flight dysbarism cases The pertinent details of the original episodes and the follow up examinations are reported The follow up interval varies from 1 month to 15 years All but one of the patients were moderately obese at the time of the reaction and at follow up The question of residua susceptibility, and disposition were discussed

REFERENCES

1 B rry C A. S v r dy b r m i Ai F c p r t s d tr i g *U S Armed F rc* M J 9 937 948 July 1958

2 B rry C A Dy b m p d m l g l a ly U publ h d p rt

3 B ry C A d W yn H H *G ad IV Chamber React ons o Instances of Neurocirculatory C llapse Occurr ng in the U S A Fo ce* 1950-1955 Report 58-85 S hool f A t M di i U S A r F r Randolph A Forc Ba T Jun 1958

4 H lb ty M R d H l J J Sev ur rcul t ry oll ps t sim l ted alt tud *U S Arm d Fo ces M J* 6 1363-1370 S pt 1955

5 G y J S I Fult J F (ed t r) *Manual of Decompre s on S ckne s* W B S und r a d Co Ph l d lph Pa 1951

6 St mb idge V P l ommuni t n

7 S h k S A. D mpr i kn s t medium lt tud *U S Arm d Fo ces M J* 8 1366-1370 S pt 1957

8 Meb n J C. Cl ni al neuropsy h try v to m d in urvey of 100 m l tary pr bl m s *J Aviat on Med.* 26 471 478 Dec 1955

9 n D b l W and H k O Oly k f ll v d und rtryck k mmarprov *Medd. F Flyg och Navalmed* 4 14 1954

10 H k O Dy b r sm man f sted by anter r spi l artery yndr m further report of c s w th r o y *J A iat on Med.* 29 540-543 July 1958

11 R burgh H L D mp es io sickn s le t o *Agardograph* 2 51 F b 1953

12. R mano J and th r Sy cop l reactions during imul ted e posure to high alt ud d mpres i ch mb *War M d.* 4 475 489 N 1943

THE FREE ACHILLES REFLEX AS AN AID IN THE DIAGNOSIS OF THYROID DYSFUNCTION

JOHN D LAWSON M / MC USA

SINCE my earlier report on the use of the free Achilles reflex as an aid in the diagnosis of thyroid dysfunction the original work has been extended to over three thousand patients It is my purpose in this communication to report on the results of this further experience

Insofar as the Achilles reflex is concerned I shall only consider the interval from the initiating stimulus to the end of contraction the S D interval shown in figure 1

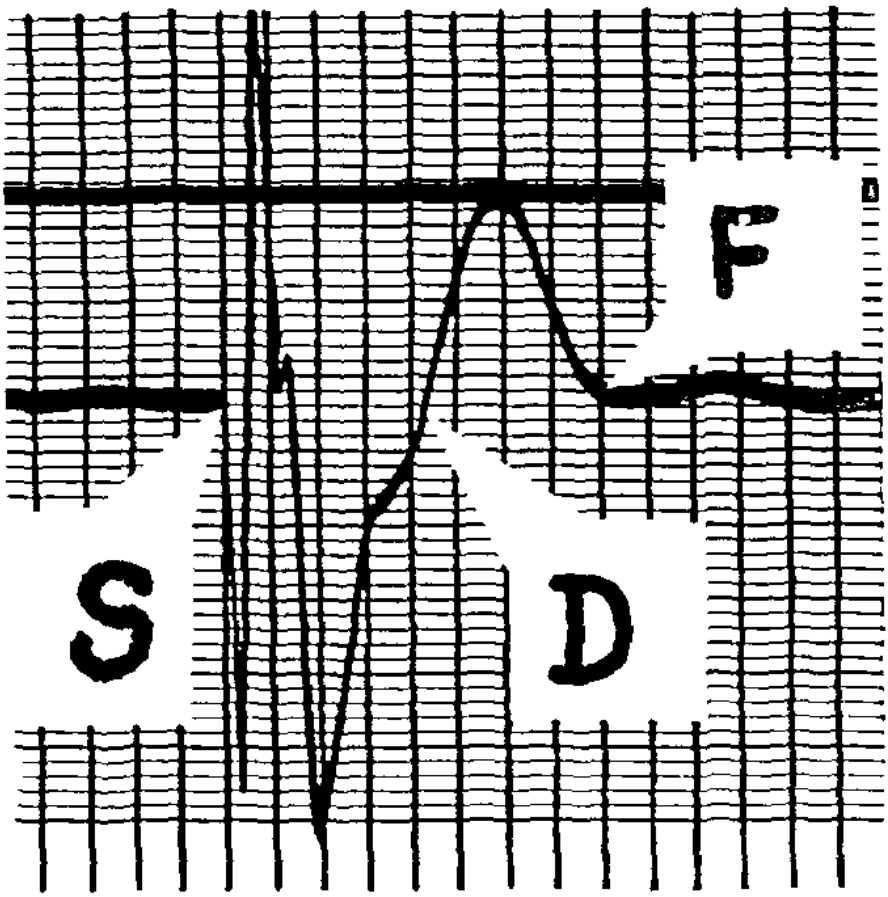
METHODS AND MATERIALS

The basic inductance apparatus the kinemometer was described in a previous publication In addition to the comments made at that time there are several points that should be elaborated on It should be noted that the complex diphasic curve registered by the apparatus that we use is a speed time curve which is not particularly related to the amplitude of the movement recorded To this degree it is like a velocity ballistocardiogram However due to the geometric configuration of the cores the inductance balance and the winding of the coils relative to the configuration of the magnet it is designed to minimize vertical and horizontal movement registration relative to the movement of the heel during the reflex recording

Three thousand and seventy two patients have now been studied Of these 2 996 were euthyroid 34 were hypothyroid and 42 were hyperthyroid In no case was the diagnosis made by me All of the patients were referred for Achilles testing after the diagnosis had been determined by conventional means and the referring physician d d not reveal the diagnosis until the testing had been completed and the results tabulated as to the S D values No patient was considered as abnormal by the referring physician unless there were at least two confirmatory tests of thyroid dysfunction including a serum protein bound iodine (PBI)

F m B ook Army H p I B ook A my M d I Cen F Sam H us T

radioactive iodine (I^{131}) uptake or conversion ratio, and basal metabolic rate



F gu e 1 A typ cal Achilles efl x trac ng showng S the point of initial stimulus D the end of muscula cont act on F the end of muscular elaxat on

RESULTS

Typical hyperthyroid tracings are shown in figure 2 Typical hypothyroid tracings are shown in figure 3

The statistical parameters obtained for the euthyroid patients were ɔ D mean 189 36 milliseconds standard deviation, 22 60 milliseconds The distribution of the euthyroid patients was somewhat platykurtic but normally distributed and when tested by the chi square goodness of fit criteria[2] more sampling variation than seen in this series would have been encountered 60 percent of the time assuming a normal distribution in the population tested

The statistical parameters for the 34 hypothyroid patients were S D mean 259 83 milliseconds standard deviation 12 49 milli seconds The values were compatible with a normal distribution However due to the sample size, a firm statement cannot be made on this point at this time

In the 42 hyperthyroid patients the S D mean was 136 32 milli seconds standard deviation 14 90 milliseconds These values were somewhat skewed to the left

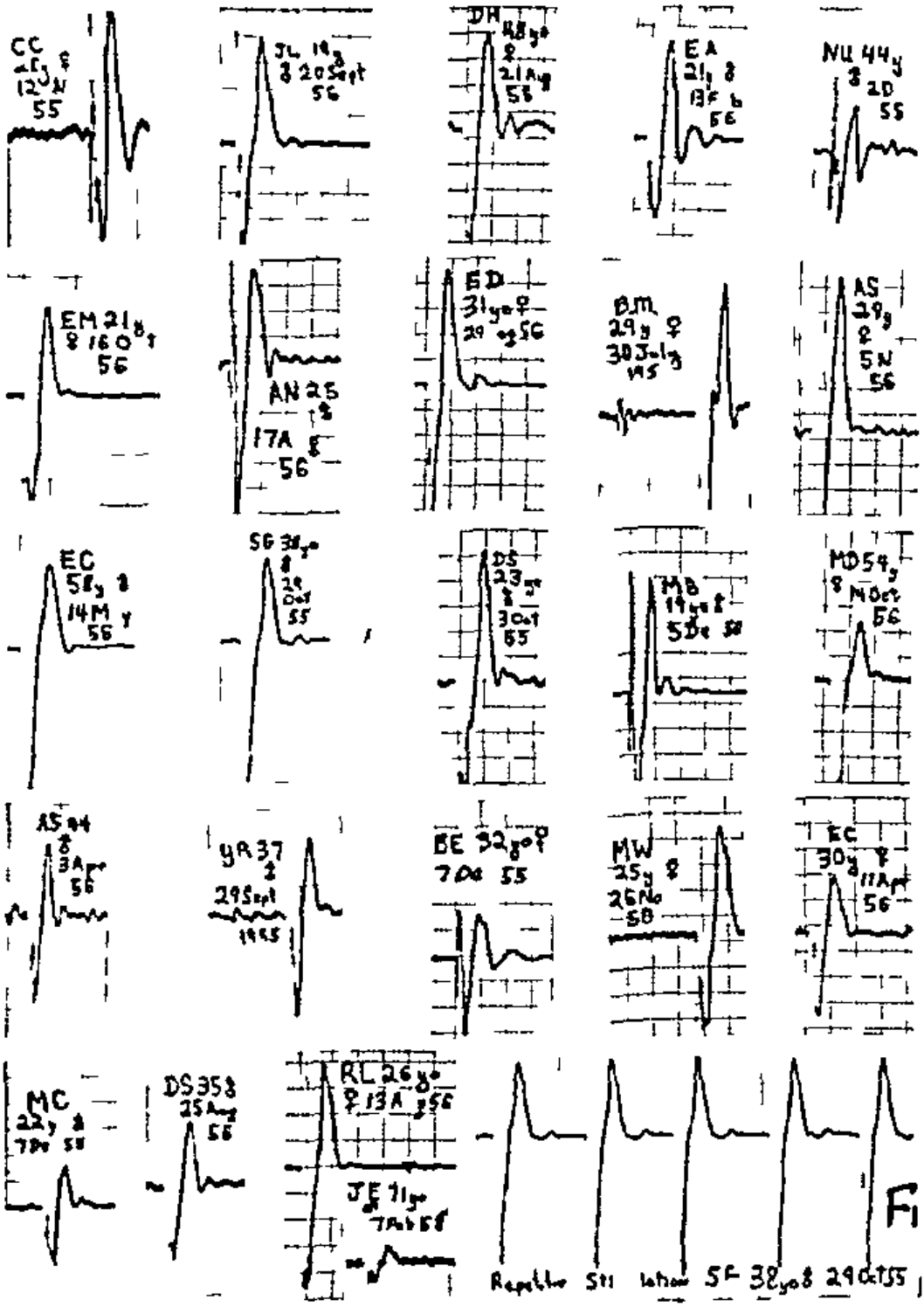
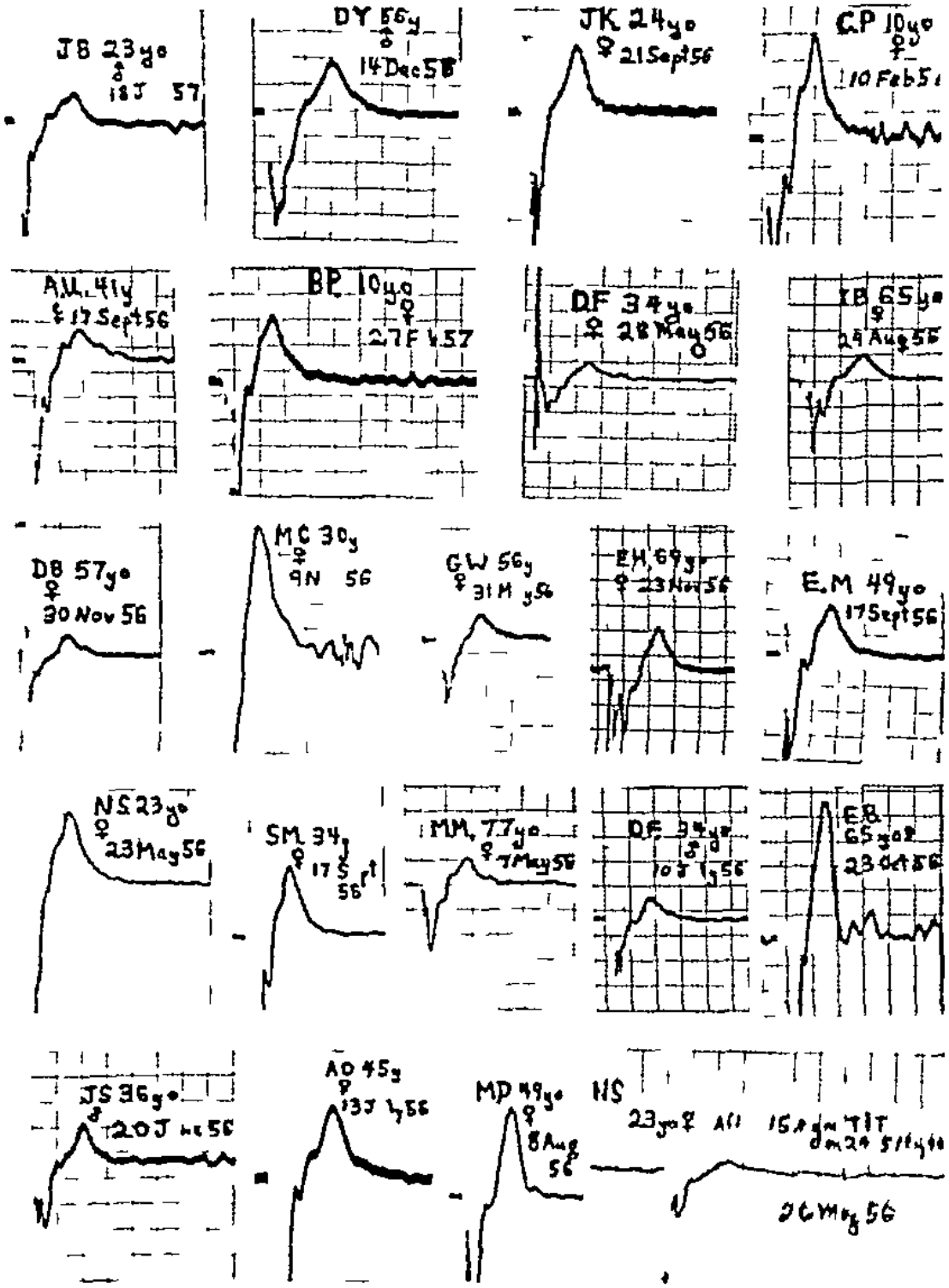


Fig 2. Typical hyperthyroid tracing

It also was found that in comparing the two legs there was an identity of response in all but 0 5 percent of the patients In 0 4 percent of the patients no Achilles reflex could be obtained



Figu e 3 Typical hypothyroid tracings

In all but two of the patients tested in whom no Achilles reflex could be obtained a satisfactory reflex was obtained using the patellar reflex with the magnet placed on the body of the quadriceps femoris muscle The intervals obtained by this method are the same as with the Achilles reflex Two of the patients demonstrated no deep tendon reflexes

TABLE I *Comparis o f ari d gn t c t t f thyro d sm 3 072 p t ent*

T st	Numb f p en	P en hypo by	P en hyp by	Per en ormal by
Euthyr di m D g				
Ach ll	2996	2 8	1 2	95 9
PBI	301	1 1	9 6	89 3
I_{131} p ak	75	7 3	4 5	88 2
I_{131} on	75	13 7	4 5	81 8
Ch l rol	253	7 2	5 2	87 6
BMR	261	16 3	17 3	66 4
Hypo byr d m				
Ach ll	34	94 1	–	5 9
PBI	34	94 1	–	5 9
I_{131} p ak	30	76 7	–	23 3
I_{131}	30	66 7	–	33 3
Ch l l	28	21 4	–	78 6
BMR	34	64 8	–	35 2
Hyperthyr d m				
Ach ll	42	–	71 4	28 6
PBI	39	–	87 6	12 4
I_{131} p k	38	–	95 0	5 0
I_{131} on u	38	–	92 2	7 8
Ch l l	40	–	25 0	75 0
BMR	40	–	90 0	10 0

N mal V l B ook Army H p l

Achill S-D rval	*140–240 m ll d*
BMR	pl m 10
Ch l erol	160–340 mg p 100 ml
I_{131} ptak	7–40 pe en f inj cted do
PBI	4.5–8 5 m g am pe 100 ml
I_{131} co er (PBI)	8–79 pe en

Th 48-h ur adi ct odi w ed h udy be hey l d bet wi h th p fin l l al st tha th 24-hour wh h w lso d

In studying the variation of the Achilles reflex two procedures were carried out In the first procedure a group of 10 euthyroid patients had weekly reflex tests for a period of four months During this observation period the maximum variation of the D interval was 16 milliseconds over all In the second procedure 20 reflexes were obtained on both legs in a group of 100 patients

and the maximum variation observed The maximum variation in reflexes under these circumstances was 20 milliseconds It should be noted, however that the usual variation was about 8 milliseconds and that in all the records 75 percent of the reflexes were within a span of 8 milliseconds This degree of reproducibility is well within the tolerances required clinically

The over all diagnostic accuracy of the tests used in this series is presented in table 1

DISCUSSION

In our hands the Achilles reflex test has proved to be a valuable adjunct in the diagnosis of thyroid dysfunction It is not intended as a test of thyroid function per se inasmuch as we consider that we are measuring an end organ response To this degree it might be considered as comparable to the basal metabolic rate and cholesterol determinations

The test should not be used as the final determinant in treatment but rather in conjunction with the other more commonly used tests of thyroid function The Achilles reflex test can be used as a simple office procedure with a minimum expenditure of time It can be used as a screening test and perhaps thereby obviate the need for more expensive and time consuming tests In conjunction with other tests it has proved of value in resolving conflicting laboratory data

SUMMARY AND CONCLUSIONS

A summary of our results in using the free Achilles reflex in the diagnosis of thyroid dysfunction has been presented This study was conducted over a period of three years on 3 072 patients In this series the Achilles reflex test was 95 9 percent accurate in diagnosing euthyroidism, 94 1 percent accurate in diagnosing hypothyroidism and 71 4 percent accurate in diagnosing hyperthyroidism These results compare favorably with the other more commonly used tests of thyroid dysfunction The procedure is simple enough to be used in office practice as a routine procedure

REFERENCES

1 L w J D F A h ll fl hypothyr d sm d hyperthyro di m *New England J Med.* 259 761–764 Oct 16 1958

2 C xto F E *Elementary Statist cs u th Appl cat ons in Ved cine* Pre tice Hall Company N w Y k N Y 1953 p 282

FRACTURES OF THE HUMERUS FROM MUSCULAR VIOLENCE

ELMER L BINGHAM *L t ant MC USN*

FRACTURES of the long bones due to muscular violence have long been included in standard textbooks dealing with fractures Review of the English literature to date reveals 10 instances of reported fractures of the humerus due to muscle violence These included one instance of a recurrence in the same humerus after eleven months This apparent void in the literature is probably more apparent than real and the fractures not so uncommon as one is lead to believe The following illustrative cases in which no underlying structural weakness was demonstrable occurred within the same year

CASE REPORTS

C 1 A 21 ye r old airman was acti ely engaged in pitchi g a baseb ll At the height of the thr w the p ti nt s a m g e w y with loud crack nd fell loosely to hi side Roentgenogr ph c ex m nation revealed a comminuted fracture thr ugh the m dshaft of the r ght humerus with a large butterfly f agment i volving the lateral aspect (f g 1A) T tment consisted of hanging arm ca t for s x weeks at wh ch time the e w s f rm clinical union (fig 1 B nd C) The p tient wa subseque tly returned to full duty

C 2. A 20 year old enlisted m n su tained fracture of the right hum rus whil pitching a ba eball in an ntramural spo ts contest The fr cture occurred t the peak of delive y with an audible crack heard in center field R e tgenogr phic examin tion r vealed a com m n t d fracture at the junct n of the middle and dist l thirds with a l rge a terolater l butte fly fragment (f g 2 A and B) The p tient w s treated with a hanging arm cast and returned to duty under tr tment after f ur weeks Follow up x rays at fourteen w eks showed s tis f ctory heal ng of the fracture (fig 2 C D and E)

C 3 A 26-year ld enlisted m n sustained an injury to the right upper arm while throwing softball During delivery of the throw from center field the patient heard a cr ck when the arm wa d rectly over head The ball was well directed and reached second base Th re wa immediate p in and weakness n the upper ext em ty Roentgenogram reve led an obl q e comminuted fr ctur in the di tal one th rd of the right h meru (fig 3 A and B) The p tient was treated with hanging arm cast a d returned to duty under treatment after four week

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Follow up examination and roentgenographic studies out of his cast six weeks post injury revealed early union of the fracture with satisfactory position and alinement (fig 3 C and D)

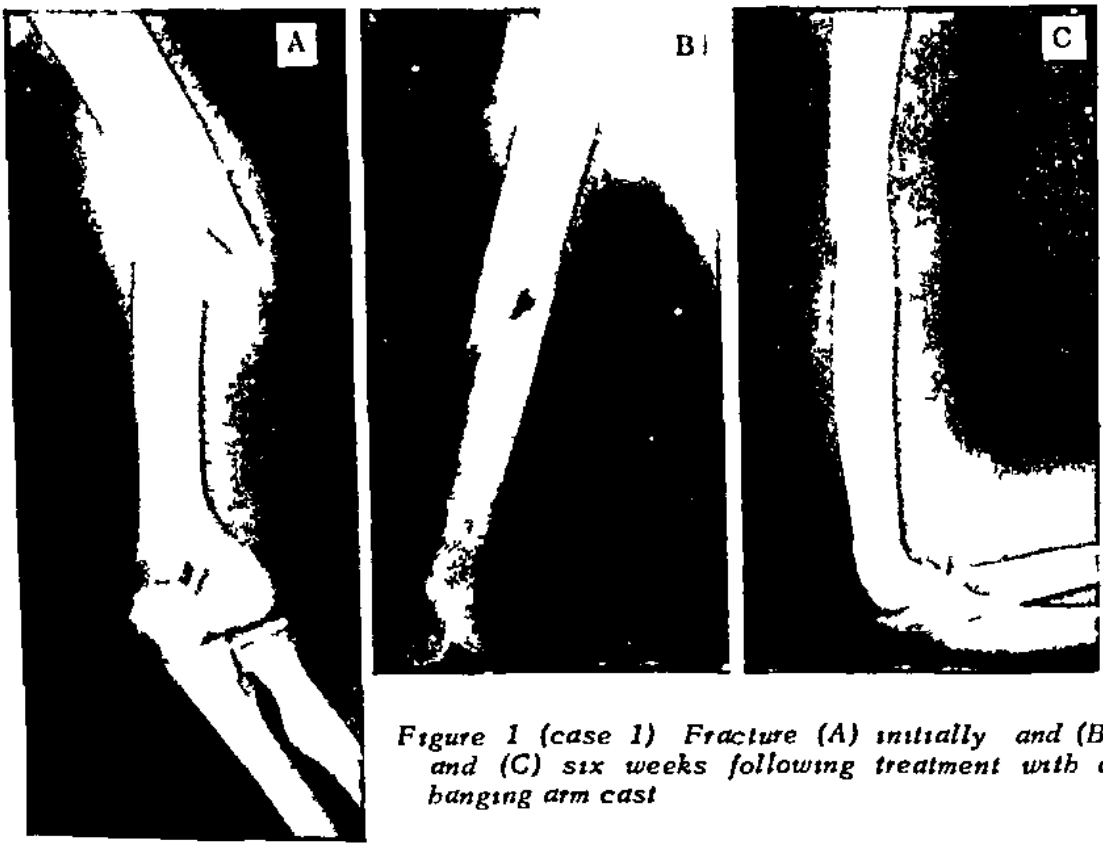


Figure 1 (case 1) Fracture (A) initially and (B) and (C) six weeks following treatment with a hanging arm cast

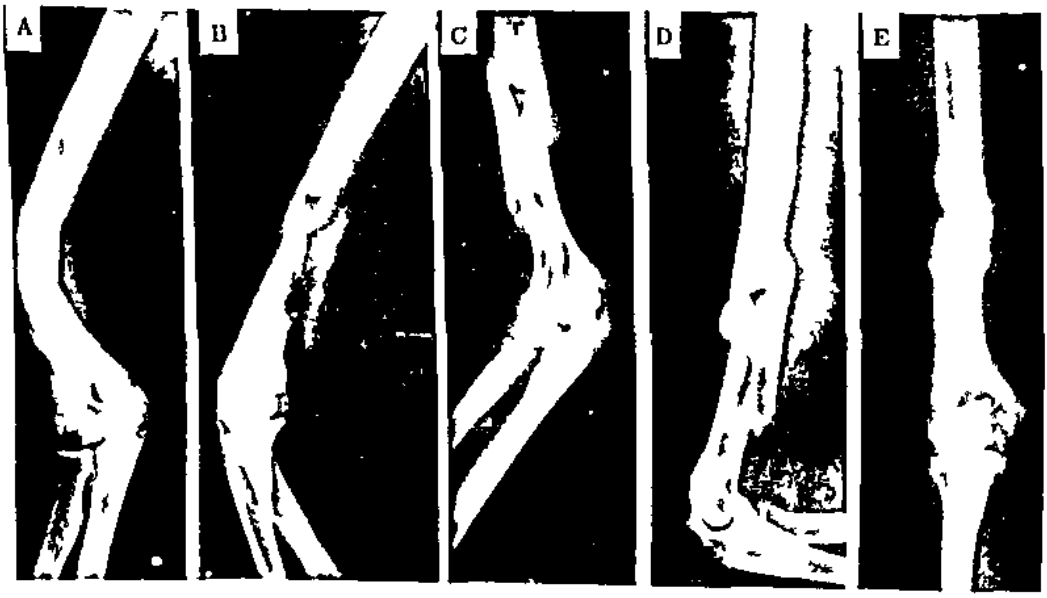


Figure 2 (case 2) The initial fracture (A) and (B) and at follow up 14 weeks after treatment (C) (D) and (E) with a hanging arm cast for 10 weeks

Case 4 A 24 year-old man was engaged in throwing a baseball in the late afternoon on a weekend In the course of the ball delivery

the upper right arm audibly cracked and fell limply to his side Roentgenographic examination revealed a short oblique fracture of the lower third of the right humerus (fig 4 A and B) An open reduction was

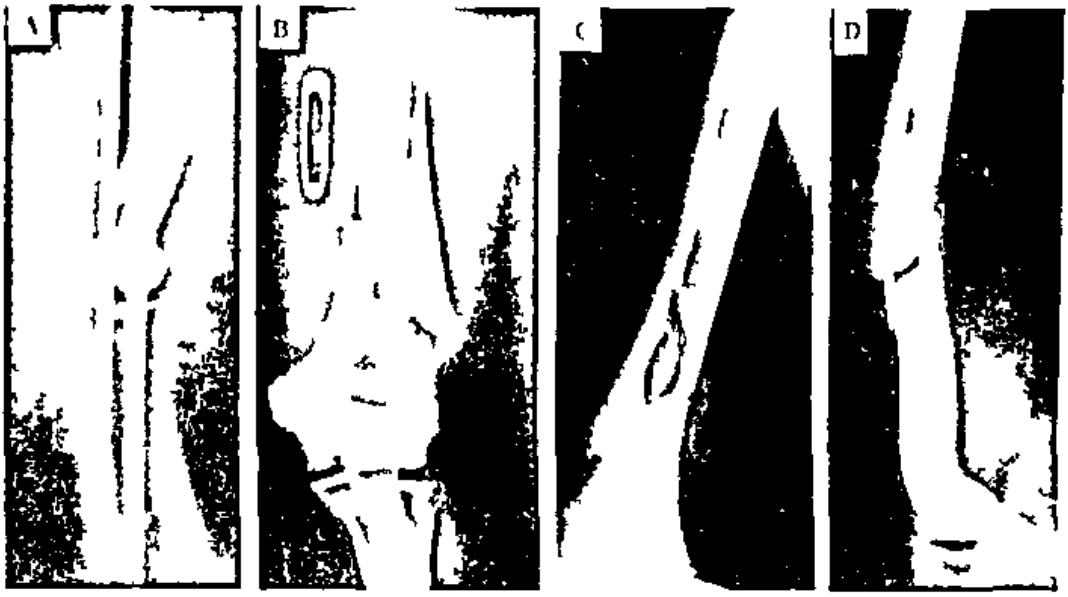


Figure 3 (Case 3) The patient (A) and (B) and at follow up (C) and (D) at examination with the hanging arm cast

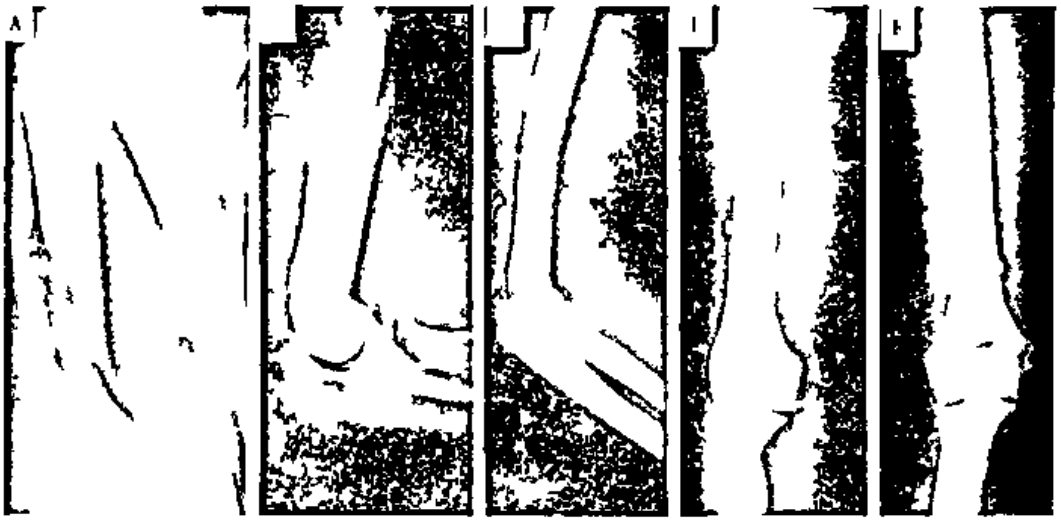


Figure 4 (Case 4) Roentgenograms showing the patient (A) and (B) and at follow up (C) (D) and (E) months after open reduction and internal fixation (Case and roentgenograms courtesy of Dr D D Gleason Oakland California)

performed and the fracture reduced and fixed with two screws in an anatomic position Long arm cast immobilization was maintained through the eighth week Follow up examination and roentgenograms taken after seven months revealed the complete healing of the fracture (fig 4 C D and E) The fracture site examined at surgery exhibited no abnormality of the bone

DISCUSSION

These fractures of severe muscular violence occurred in healthy young men, none of whom were athletically conditioned In none was there clinical or roentgenographic evidence of under lying bone disease

The muscles of the upper arm—primarily deltoid, supra spinatus, infraspinatus, and terres minor—hold the head of the humerus in a relatively fixed position of external rotation The flexors attached to the lower humeral shaft—primarily coraco brachialis, biceps, and brachialis—aided by the leverage of the bent forearm, are twisted into internal rotation, producing a power ful torsion on the shaft of the humerus This mechanical effect of the long forearm lever, coupled with the powerful muscle pull, places a force on the fulcrum of fracture beyond the breaking point of the humerus

It would seem that in these individuals the degree of co ordination and conditioning was such that the abductors and external rotators did not have sufficient time to relax before the rapidly contracting flexors and internal rotators produced sufficient strain on the lower humeral shafts to produce quite similar fractures

SUMMARY

Four cases of fracture of the humerus sustained by ball throw ing have been presented The probable mechanism of fracture has been considered Such fractures due to muscle violence may well be anticipated when strenuous sports are engaged in without the conditioning usually accompanying organized athletics

REFERENCES

1 k y I A d C w ll H E *Th Management of F actures Dislocat ons and Sp ain* 5th edit n Th C V M sby Comp y St Louis Mo 1951 pp 527 541

2 Clemmo H M d H mm d G Sp ta u f ctur f hum ru d to muscl ole *Guthr Cl n. B ll* 17 49 50 Oct 1947

3 D tt r W E L ttl le g t sho lder fr ctur of p mal epiphy s l c rtilage f h mer d t b s ball p tch g *Guthrie Cl n Bull* 23 68 72 July 1953

4 H m tk M H nd Klun F R B ll thr w g fr ctur of hum s *M Ann Di tr ct of Columb* 21 196-199 Apr 1952

5 Wilm th C L R curr t fractur of humerus due t sudd n xtreme musc l r t on *J Bo & Joint Surg* 12 168 169 J n 1930

PAPULAR URTICARIA CAUSED BY RED ANTS

HOWARD S YAFFEE *L t t MC USNR*

IN recent years most dermatologists have accepted the causative role of insects in papular urticaria Shaffer Spencer and Blank named the flea as the offender in some cases Flies chiggers mosquitos and bedbugs have all been incriminated Absent from most lists of causative agents is the red ant. This is a report of two cases in which the common red ant *Monomorium pharaonis* [1] is believed to be the offender

CASE REPORTS

C 1 A 24 year-old para 2 gravida 1 housewife was seen in her third month of pregnancy complaining of a skin eruption which had bothered her from late May to the date of her visit in August The lesions began as conical papules became extremely pruritic lasted for three days and then subsided with a brownish discoloration persisting for about three weeks Attacks occurred both day and night and usually were characterized by multiple lesions—as many as 20 at a time The patient believed these might be the result of eating chocolate to which she had no known previous sensitivity

On examination the patient exhibited the above-described urticarial lesions some distributed in lines predominantly on the outer aspect of the arms and thighs There also was severe seborrhea oleosa of the scalp mild seborrheic dermatitis of the chest and face and moderate keratosis pilaris all present for many years

Questioning disclosed that itching seemed to occur most often when the patient was in her bedroom which adjoined a porch Once she had removed a towel from the bedroom floor felt a sharp stinging and on looking down saw countless tiny red ants one of which was on her thigh. While still observing she noted the onset of typical urticarial papule with a central tiny punctum typical of the skin lesions with which she was concerned With the use of appropriate insecticides both the ant population and the disease were eliminated

C 2. A seven-year-old girl was seen in the pediatric clinic of this hospital where she had been referred because of a food allergy which had not responded to elimination diets and hyposensitization tests given by an allergist For about nine months she had been bothered by small hive like lesions which appeared intermittently were intensely pruritic and which she scratched Attacks would occur any time day

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From U S Naval Hospital Chelsea Massachusetts Dr Yaffee now with 60 Brattle Street Cambridge Mass

or night and sometimes were preceded by a sharp stinging sensation Lesions were located over the outer aspects of the child s arms and legs with a few involving the lower trunk

Each lesion consisted of a 5 mm to 1 cm urticarial papular conical shaped excoriated areas The remainder of the physical examination findings were normal Examination of a stool specimen disclosed *Enterobius vermicularis* Blood study findings were normal

The family had lived in the South until one year prior to their clinic visit They believed that the child s eruption might have been related to their second home to which they had moved about nine months previously The family kept no pets although the child played with a neighbor's cat Administration of a vermifuge resulted in cure of the pinworm infestation Elimination of the cat produced no change in the eruption, which continued unabated in spite of both measures

The youngster frequently played in an area in her home where red ants were seen and it was noted that lesions occurred subsequently A search disclosed numerous red ants throughout the house Rather than deal further with this vexing situation the parents immediately changed their residence The child s eruptions came to an abrupt halt and did not return

DISCUSSION

Despite a prolonged period in which atopy and food allergy were reported in the medical literature as being responsible for papular urticaria, it is interesting that Bateman[4] stated, in reference to this condition, "Its first appearance is in irregular inflamed wheals so closely resembling the spots excited by the bites of bugs or gnats as to almost deceive the observer"

Apparently a state of immunity must be reached before lesions are produced by the bite of the causative vector Insects placed on the skin of a newborn infant fail to produce urticarial or delayed types of response In the majority of cases, an adult bitten for the first time will show little evidence, except perhaps a small punctum The papular stage then supervenes, and when contact with the offending insect is prolonged the usual reaction is the loss of the "delayed" papular response (such as seen in the tuberculin type of hypersensitivity papule noted 48 hours after inoculation) and the conversion to the "urticarial" or "immediate" type of reaction

Although anaphylactoid reactions[5, 6] to the bite or sting of ants, and even cases in which the sting proved fatal,[7] have been reported, the earliest report which I was able to find in which ants were incriminated as a cause of papular urticaria was by Chipman[8] who cited Dr H E Alderson of San Francisco Dr Alderson observed urticarial papules, in newcomers to Honolulu, which he thought were caused by fruit and fish "but also by the bite of the tiny ant" He stated, "The ant seems to perform the role which the flea plays here"

The red ants observed in case 1 were later identified as belonging to *Monomorium pharaonis* a nearly cosmopolitan species of ant which is common in homes in the New England area These insects are distantly related to the more recently famous fire ant *Solenopsis saevissima* and interestingly do not secrete the primary irritant formic acid Their toxic principle is unknown The reaction to the bite of these ants suggests an immunologic mechanism resembling the reaction described for fleas however there is no direct proof for this supposition since skin testing was not carried out

SUMMARY

Two cases of papular urticaria are presented in which the offending agent was identified a *Monomorium pharaonis* in one (the common red ant) and probably responsible for the other

REFERENCES

1 Sh ff B Sp M C d Bl k H P p l π p t t tm t w th DDT nd l f b t t l gy *J Invest Dermat* 11 293-298 O t 1948

2 Goldm L (C) L h urt y d m m f t f t ty b f m p f rth p d *Ar b Derm t & Syph* 58 74 79 J ly 1948

3 H ll D W d Sm h J C Stud ph M m m ph ra Som M *Ent mologist M nthly Magaz ne* 90 176-182 A g 19 1954

4 B t m T *A Pr tic l Synop s of Cut neous D* 3d d L gm Hur R O m d B w L d 1814 p 13

5 Mo h C. H U l ct b *J A M A.* 141 193 S p 17 1949

6 Art g yt A C A t ymp m f h k f m b f *A h urug med* 48 178-185 Ap M y J 1956 (Ab) *J A M A* 164 817 J 15 1957

7 B w R I t d ll g p bl m *S uth M. J* 44 836-841 Sept 1951 C t d S tt R L J *D as f the Sk n.* 11 h d Th C V M by C m- p y S L M 1956 p 642

8 Ch pm E D Urt w th p f f p pul f rm f h ld *C l f Stat J M d* 8 207 09 Jun 1910

9 W l E O D pt f B l gy H tv d U y P r l mm

10 B W L D p f B l gy H d U y P l mm

PUBLIC ESTEEM OF SURGEONS

The esteem in which surgeons re held by the publ c has undeniably dimini hed in ecent year de pit remark able ad a ces in scientific achiev m nt This egrett ble situ t on stems from a ubtle deter orat n in our traditi nal standa ds for profe si nal c nd ct Restoration of p bl c confidence in the future lies la gely in the hands of the men and w men who a e now recei ing re id n y training Th re fore while t is essential that these re ident acqu s und surgical concepts and at lea t a reaso able deg e of technic l k ll it is equally important that g eater at te tio be g ven to the attitudes nd habits which they develop du ng the residenci s nd carry with th m nto p actice —John Paul North The Compleat Surgeon (edit r 1) *Su gery Gyn ol gy & Ob tet s* Dec mb 1958

GRAVITY ACTIVATED SHUTTER FOR RADIOGRAPHY WITH X RAY THERAPY MACHINES

HARRY L BERMAN *Colonel MC USA*
GERALD M McDONNEL *Lieutenant Colonel MC USA*

OCCASIONS may arise when radiation therapy machines are used for diagnostic radiography This is true of both intermediate voltage and supervoltage machines, as has been described in several articles [1-3]

In order to use radiation therapy machines most efficiently for radiographic purposes exposures should be made when voltage and amperage are at maximum desired levels Conventional diagnostic x ray machines are constructed to permit this to be accomplished with great rapidity but in radiation therapy the build up of voltage and amperage to optimum levels takes place much more slowly During this build up period, exposure of the patient and of the film should be avoided if satisfactory, reproducible radiographic technics are to be developed

The fundamental requirements for radiography with radiation therapy machines are the interposition of a radiation impervious barrier between the plane of exit of the x ray beam from the machine and the patient, and an arrangement for its removal when optimum voltage and amperage have been reached

These requirements can be met by the use of a gravity activated lead shutter (fig 1) which can be positioned to cover the end of the cone or other collimating device through which the x ray beam is emitted (fig 2A) When the operator is ready to make the exposure, he causes the shutter to drop instantaneously from the path of the beam

This device consists of an iron frame within which a movable lead barrier of appropriate thickness slides up and down easily The lead barrier is just large enough to cover the egress of the x ray beam For use with the 1 000,000 volt machine, the lead shutter is 1 inch thick, while it measures one eighth inch in thickness for the 200 kv machine The length of the frame is approximately twice that of the lead barrier in order to provide enough

From Walter Reed Army Hospital Washington D C

time that voltage and amperage are being raised to optimum levels and then falls quickly to a nonobstructing position permitting the exposure to be made

REFERENCES

1 Tudd h m W J G bbo J F H I J d P d g E P S p rv l g d m lt pl m l g g phy— w t h f oe m f h *Rad l gy* 63 184 190 Aug 1954
2 M D l G M B m H L d L dm ll E A S p rv l g oe g gr phy *Am J P entgenol* 79 306-320 F b 1958
3 Har J H J Tu.d h m W J H l J d P J g E P 250-k l l h g phy p l m ry port *Pads l gy* 69 748 749 \ 1957

MEDICINE—CIVILIAN AND MILITARY

It is to the b nefit of o r cou try th t clos liaiso be c nt nuously m t i ed betwe the med c l serv ces of th a med for es and thos of th c v l an pop l t on We as c vili b nef t f m the rese rch and perien of the armed force nd nt g ate int our p ctice the k owl dg that th y h g n d Th arm d fo c do th m w th the r ult of our civili rese rch Th cl l aiso lso m ke act duty more ttract e and profit ble f r the reserve offic r and c eates a professi nal tmosphe e that much more s ti f ctory to those d ctors who choose the r gular serv ce as a career As a fin l p nt this li i on permits us to kn w better the probl m of th s rv ce do tor and armed with this knowledg we an help the s rv ces atta n professio al economic and m g m nt goals for their d ctors which w ll go a long w v tow rd pro id ng the corps of regul r phys ci n neces ary to gi e medical service to our m litary arms —Waltman W lters Research Inv st gation and Teaching in the *A m d Forces Medical Service (ed torial) A W A. Arch ves / S g ry* F b y 195

CHLORMELAMINE AND IODIZED CHLORMELAMINE GERMICIDAL RINSE FORMULATIONS

Essential Physical and Chemical Characteristics and Germicidal Efficiencies

SHIH L. CHANG *M. D.*
GERALD BERG *Ph. D.*

IN COMPOUNDING a germicidal rinse for the U. S. Army the following factors were taken into consideration: (1) a large number of service men dip their partially cleaned mess gear into the same rinse; (2) the duration of each dip is probably a matter of seconds; (3) the germicidal rinse must be prepared with water available in the field; (4) the compound must be packaged in nonbreakable containers which may be stored under tropical conditions for a long period of time; (5) the rinse must be usable for disinfection of fresh vegetables and fruits.

With these prerequisite conditions it is clear that the disinfectant incorporated into the rinse composition must not only have a high efficiency in destroying pathogenic bacteria, viruses and protozoan cysts over a wide temperature range but must also be stable during high temperature storage and retain its activity in the presence of ever increasing amounts of food waste or other organic matter during the period of use. The compound also must contain enough surfactant to wet the greasy surfaces of mess gear and the waxy surfaces of fresh vegetables and fruits.

These necessary properties limited the field of selection almost exclusively to the N-chloro compounds. Organic hydroperiodides such as the tetraglycine hydroperiodide used in water disinfection [1] which liberate elemental iodine in solution are promising disinfectants but generally lack the stability to fulfill the packaging and storage requirements. Molecular iodine (I_2) however can be used as the principal disinfectant by incorporating into the rinse composition a stable iodide which is oxidized to I_2 when the rinse is prepared.

From the Research Laboratories, Chemical Corps Medical Laboratories, Army Chemical Center, Md. (Chief: Colonel Leon A. Fox, MC). Dr. Chang is Chief, Physiological Chemistry Section, and Dr. Berg is Chief, Bacteriology Section. This work was carried out under the direction of the Preventive Medicine Division, Office of the Surgeon General, U. S. Army.

Of the N chlor compounds the monochlor members (monochlor amine T azochloramide etc) possess inadequate germicidal activity and the dichlor members (halazone dichlorodimethylhydantoin etc) are not sufficiently stable to fulfill the packaging storage and organic matter tolerance requirements A third group of N chlor compounds represented by trichlormelamine (TCM) and hexachlormelamine has received relatively little attention in the field of disinfection Hexachlormelamine is not sufficiently soluble to be of practical use and TCM liberates insufficient HOCl (at neutral and slightly alkaline pH) to be an adequate water disinfectant unless modified

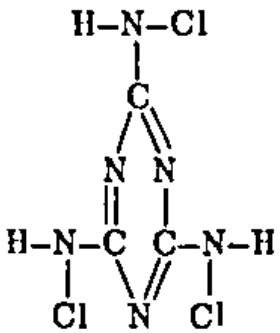
However the complex molecular structure and the presence of three chlorine atoms in each molecule of TCM indicate that this N chlor compound has a greater potential than the dichlor compounds for the release of HOCl and that factors such as pH and temperature may have profound effects on HOCl release In a preliminary study it was found that TCM liberating 200 ppm of titrable chlorine at acid pH produced impressive rates of destruction of *Streptococcus pyogenes Streptococcus faecalis Staphylococcus aureus* and *Escherichia coli*

Since TCM is stable especially when mixed with an acid (see below) it appeared that a composition containing TCM and acid would possess greater germicidal activity than the dichlor and yet maintain the stability of the monochlor compounds Under an agreement with the Army Quartermaster General the Wallace and Tiernan Company New Jersey undertook the formulation of TCM compositions Samples of several compositions were furnished by that company for experimental studies the one that appeared most promising is described in this report The company undertook also the task of compounding iodized TCM formulations with coated KI to prevent the release of I during storage Samples of several of these formulations were also received and experiments on the one that appeared most promising are also reported here

For comparison three dichlorodimethylhydantoin (DDH) compositions and two iodine compositions were included in some parts of the study

MATERIALS AND METHODS

TCM is prepared by chlorinating melamine (2 4 6 triamino s triazine) Its chemical structure is believed to be



The theoretical active chlorine content of this compound is 46 3 per cent by weight or 92 6 per cent by titration, and averages 91 per cent in actual titration The formation of several isomers is possible the commercial product probably contains some or all of them TCM powder is whitish in color Because it is hydro phobic, a wetting or "carrying" agent—usually an inorganic salt—is needed to solubilize it rapidly in water At room temperature, its solubility reaches about 300 ppm (parts per million) titrable chlorine at equilibrium at 5° C, its solubility is reduced to about 100 ppm

TCM is one of the most stable of the N chlor compounds Heat ing the powder at 100° C for days or boiling it in solution for short times results in little loss of titrable chlorine Stability is increased when TCM is mixed with an acid In aqueous solu tions, as determined by amperometric titration, liberation of HOCl increases as pH decreases approaching a maximum at pH 3 0 TCM can be mixed with anionic or cationic detergents without affecting its titrable chlorine its titrable chlorine is affected, however by the presence of oxidizable nonionic detergents

TCM compositions The ingredients compounded in the TCM compositions are as follows

Ingredients	Per cent by weight	
	Minimum	Maximum
TCM	21 5	27 5
Sodium dodecyl benzene sulfonate	11 5	12 5
Anhydrous citric acid	51 0	55 0
Anhydrous NaH_2PO_4	Remainder	

A 0 1 per cent solution of a composition in distilled water con tains from 197 ± 5 to 248 ± 6 ppm titrable chlorine a surface tension of 39 ± 0 7 dynes per cm at 25° C and a pH of 2 8 ± 0 1

Iodized TCM compositions The iodized TCM compositions are prepared by incorporating KI in the TCM formulations de scribed above The amount of KI used in each composition de pends upon the concentration of titrable I_2 desired The surface tension and pH of the TCM compositions in solution do not change significantly in the presence of the KI concentrations incorpo rated

Dichlorodimethylhydantoin (DDH) compositions Three DDH compositions were available A sample of one designated as dichlorodimethylhydantoin composition was furnished by W D Tiedeman of the New York State Health Department Samples of the other two compositions were received from the Office of the Quartermaster General The latter were designated as IDDH I and II (improved dichlorodimethylhydantoin compositions I and II) According to the suppliers the ingredients, titrable chlorine, pH, and surface tension of 0 1 per cent aqueous solutions of each of these compositions were as follows

Ingredient	Per cent by Weight DDH Formula	IDDH I	IDDH II
DDH (dichlorodimethylhydantoin)	25	58	58
Alkyl naphthalene sulfon te – 80 per cent active	10	0	0
Alkyl naphthalene sulfonate (NSAE)	0	2	0
Alkyl aryl sulfonate (kreelon 8D 80 per cent active)	0	0	7
Anhydrous citric acid	0	40	35
Sodium dihydrogen pho phate	5	0	0
S d um sulfate (anhydrous)	15	0	0
Sodium chloride	45	0	0

(As 0 1 per cent s l t on in distilled water)

Titrabl chlorin ppm	170 ppm	383 ppm	387 ppm
Surfac tension (dy /cm at 25)	49 50	53 5	36 0
pH at 25 C	5 0	3 0	3 1

Iodine compositions Samples of two iodine compositions designated as iodine compositions I and II were received from the Office of the Quartermaster General Iodine composition I reportedly contained the following ingredients by weight 5 per cent elemental iodine 30 per cent polyethylene oxide and 65 per cent urea in actual titration however this composition contained 8 33 per cent total iodine by weight at least 6 per cent of which was in titrable form Iodine composition II reportedly contained the following ingredients by weight 59 per cent trisodium triiodo ethylene diamine tetraacetate dihydrate (Na C H N O I 2H O) 12 5 per cent ultra wet K Dense (detergent) 20 per cent anhydrous citric acid and 8 5 per cent anhydrous sodium dihydrogen phosphate A 0 1 per cent solution of this composition reportedly contained 200 to 220 ppm of titrable iodine and had a pH of 3 1 Determinations in our laboratories demonstrated a titrable iodine content of 190 ppm and a pH of 3 3 to 3 4

Test organisms *Escherichia coli* was used in the bactericidal tests Suspensions were prepared by repeated centrifuging of bottle culture washings and resuspending the settled cells in normal saline to give an approximate concentration of 1 × 10 organisms per ml Cysts of the NRS strain of *Endamoeba histolytica* were used in the cysticidal tests The methods for producing cysts in culture purifying cyst suspensions and enumerating cysts have been described in two previous reports

The Connecticut 5 strain of coxsackie group B type 1 virus was used in most of the viricidal tests In several tests the MEF1 strain of poliovirus type 2 the Mahoney strain of polio

virus type 1, the NIH 93 strain of coxsackie group A type 2 virus and the Wallace strain of echo 7 virus were used Since the viricidal part of the study will be presented in detail in a separate report (in preparation) the methods for preparing virus suspensions, purifying the suspensions when necessary and testing for virus survival are omitted in this presentation It should be noted, however that the LD_{50} end point method was used in computing virus concentrations determined by animal inoculations and the most probable number method[5] was used in computing virus concentrations determined by the inoculation of monkey kidney tissue cultures

Titrable chlorine or iodine was measured by the acid starch iodine method Titrable iodine in the presence of titrable chlorine was determined photometrically after $CHCl_3$ extraction

Germicidal test conditions To provide a margin of safety for field use germicidal rinse compositions should be evaluated under test conditions representative of the most adverse field situations likely to be encountered Among the interfering factors alkalinity organic matter and temperature are the most important Alkalinity normally present as bicarbonate in natural waters was supplied in the test water by the use of $CaCl_2$ and $NaHCO_3$ Alkalinity is expressed in ppm $CaCO_3$

Selection of organic matter required some consideration Preliminary tests on a number of organic materials including peptone mayonnaise potato coffee tea egg albumin and milk demonstrated that peptone was by far the most interfering On the assumption that a man may leave as much as 20 gm of food on his partially cleaned mess gear and that 10 per cent of the waste is organic matter one hundred men may introduce into 25 gallons of germicidal rinse a total of 200 gm of organic matter Therefore the presence of 0 2 per cent peptone in the rinse for a period of 2 hours prior to a germicidal test probably provides a reasonable margin of safety in the interpretation of data for field use

Hence all germicidal tests were carried out with distilled water containing 300 ppm bicarbonate alkalinity which represents the upper limit of alkalinity normally encountered in natural waters and 0 2 per cent peptone (Bacto) after a 2 hour peptone contact time In bactericidal tests and in tests carried out with type 2 poliovirus the survival of which was not affected by a temperature of 50° C within the contact times used temperatures of 5° C 25° C and 50° C were used Cysticidal tests were carried out at 5° C 25° C and 45° C, because cysts are rapidly destroyed by heat after short contact times at 50° C but not at 45° C Most of the viricidal tests were carried out at 5° C and 25° C since some of the viruses tested are destroyed rapidly by heat at 45° C

Germicidal test procedure A weighed amount of the germicidal rinse composition under investigation was dissolved in the bicar

bonate water at the desired temperature The peptone was added as soon as the composition had dissolved Two hours after the addition of peptone a suspension of test organisms was added which resulted in a test fluid concentration of approximately 100 million bacteria per ml or 50 cysts per ml or 1 000 to 50 000 LD_t or MPNCU s (most probable number of cytopathogenic units) of virus per inoculum

After contact times ranging from 15 to 180 seconds samples in bactericidal and viricidal tests were removed and mixed immediately with known amounts of a neutralizer (containing Na_2SO $Na\ P_2O$ and glycerine) In cysticidal tests the neutralizer was poured into the test fluid after each contact time The neutralized samples were titrated in survival tests for *E coli* and viruses and were centrifuged in the cysticidal tests for recovery of viable cysts

Two controls were used one without addition of the germicidal composition and one with neutralized composition Percentages of surviving bacteria and viruses were determined using the numbers present in the controls as the initial concentrations Cyst concentrations were computed on an all or none basis the survival of viable cysts indicated a destruction of less than 99 998 per cent of the cysts while negative cultures demonstrated a destruction of 99 998 per cent of the cysts

RESULTS AND ANALYSES

Essential Physical and Chemical Characteristics of the TCM and Iodized TCM Compositions

Effect of storage on titrable halogen and surface tension of the TCM and coated KI TCM compositions Dry samples of a TCM composition and an iodized TCM composition containing enough coated KI to replace 17 per cent of the titrable chlorine by titrable iodine were stored in bottles at both 23 C to 29 C and 50 C These compositions were tested periodically for titrable halogen and surface tension (measured by a calibrated du Nuoy tensiometer) The averages of triplicate determinations and their standard deviations were computed and are presented in Table 1

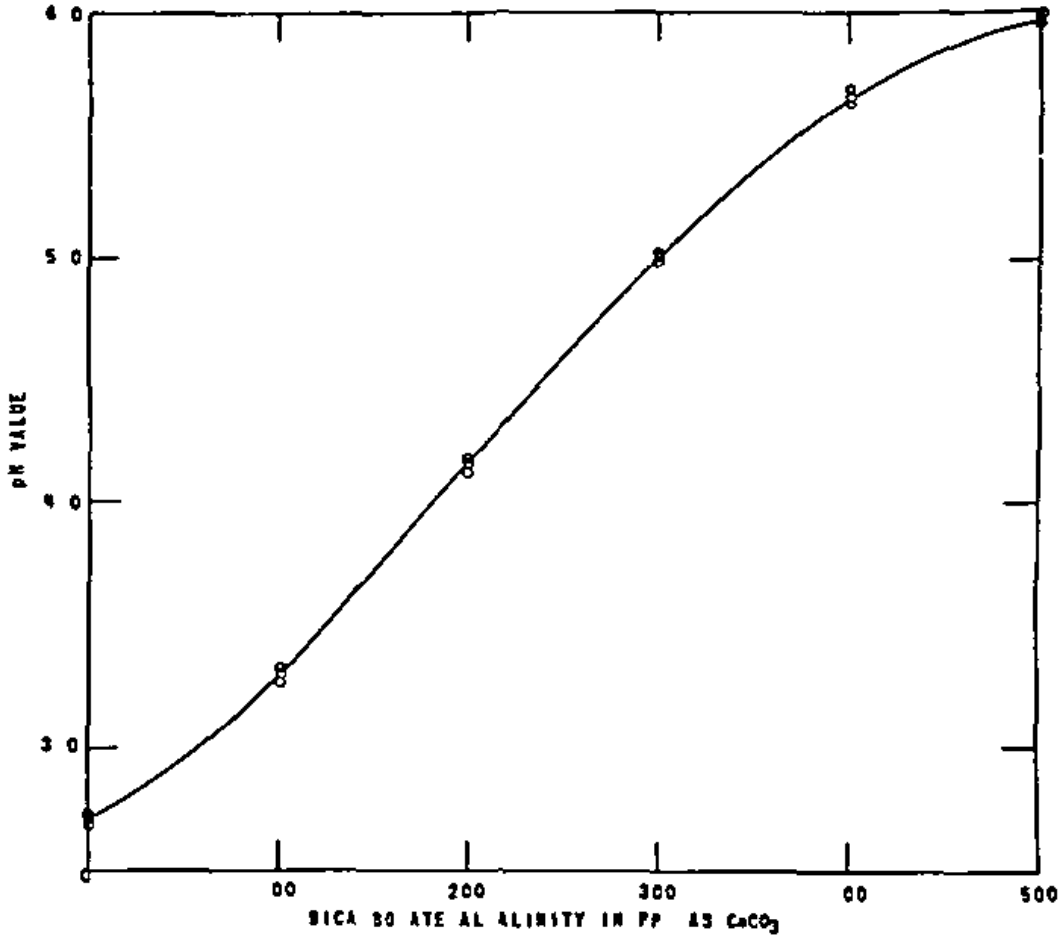
Table 1 shows that the TCM composition suffered almost no loss in titrable chlorine or increase in surface tension on storage for as long as 360 days at 23 C to 29 C or after 90 days at 50 C Even after 150 days at 50 C there was no change in surface tension and the loss of titrable chlorine was only about 10 per cent The coated KI TCM composition retained its tension at the 38 to 39 dyne per cm level after 180 days of storage at the lower temperature and after 60 days of storage at the higher temperature There was little loss in titrable halogen after 180 days at 23 C to 29 C but a loss of about 15 per cent occurred after 60 days at 50 C

TABLE 1 *Titrable chlorine and surface tension of TCM and coated KI TCM compositions after varying storage periods*

Composition	Storage temperature (°C)	Storage time in days	Solution strength (gm/liter)	Titrable chlorine (ppm)	Surface tension (dynes/cm)
TCM I	23–29	At start	1.0	191 ± 2.5	39 ± 0.7
		120	1.0	190 ± 1.4	38 ± 0.8
		240	1.0	188 ± 2.2	39 ± 0.7
		360	1.0	189 ± 1.1	39 ± 0.8
	50	At start	1.0	191 ± 2.5	39 ± 0.7
		60	1.0	190 ± 2.2	38 ± 0.7
		90	1.0	183 ± 4.1	39 ± 0.2
		150	1.0	172 ± 2.1	39 ± 0.8
Coated KI TCM	23–29	At start	1.37	202 ± 5.2	38 ± 0.8
		90	1.37	190 ± 4.1	39 ± 0.4
		180	1.37	186 ± 3.5	39 ± 0.9
	50	At start	1.37	202 ± 3.2	38 ± 0.8
		30	1.37	188 ± 4.6	39 ± 0.8
		60	1.37	170 ± 5.6	39 ± 0.6

E gh iod de to conv rt 17″ of th titr ble chlor n nto t trable iodi e Its figures und r titrable chlorine are titrable halogen n chlor n

Alkalinity tolerance of TCM compositions The alkalinity tol erance of the TCM formula was ascertained by determining the pH values of 0 1 percent solutions of the composition without and with 100 200 300 400 and 500 ppm bicarbonate alkalinity Results of these determinations are presented in Figure 1 This figure shows that the pH of a solution of the TCM composition rose steadily with increase in bicarbonate but even at a bi carbonate concentration of 300 ppm a pH of 5 0 was maintained The pH changes were essentially the same in a 0 137 per cent solution of the iodized TC I composition (the 0 037 per cent increase compensated for the weight of the coated hI)



F gur 1 Eff t f add d b b t alk l uty th pH of 0 1 p t lut on f the hl m lam fo m la at 25 C.

Stability in solution of TCM compositions The stability of the TCM and the iodized TCM compositions in solution was de termined by measuring their titrable chlorine or titrable halogen as chlorine after varying periods at temperatures of 5 C 25 C and 50° C For comparison parallel determinations were made on solutions of the DDH and on those of an iodine composition These results are summarized in Table 2

Table 2 shows that the TCM composition was stable in solu tion for at least 2 hours at all three temperatures The iodized

TCM composition was completely stable at 5° C and lost less than 10 per cent of its titrable halogen (expressed as titrable chlorine) after 2 hours at 25° C At 50° C about 12 per cent of the titrable halogen was lost in 30 minutes and about 16 per cent was gone in 120 minutes The loss of titrable chlorine by the DDH composition was about 80 to 100 percent greater than that by the iodized TCM composition at both 25° C and 50° C The loss of titrable iodine by iodine composition II was even greater than that by DDH especially at 50° C

TABLE 2 *Stability of solutions of four different germicidal rinse com positions on standing at varying temperatures*

Composition	Solution strength	Standing time (min)	Titrable chlorine or iodine (ppm) 5 C	25 C	50 C
TCM	0 1%	Start	192	192	192
		30	189	188	188
		120	190	189	188
Iodized TCM*	0 137%	Start	202	202	202
		30	200	198	177
		120	198	185	170
DDH	0 1%	Start	178	178	178
		30	175	168	152
		120	173	146	126
Iodine formula II	0 1%	Start	190	190	190
		30	188	176	135
		120	151	126	52

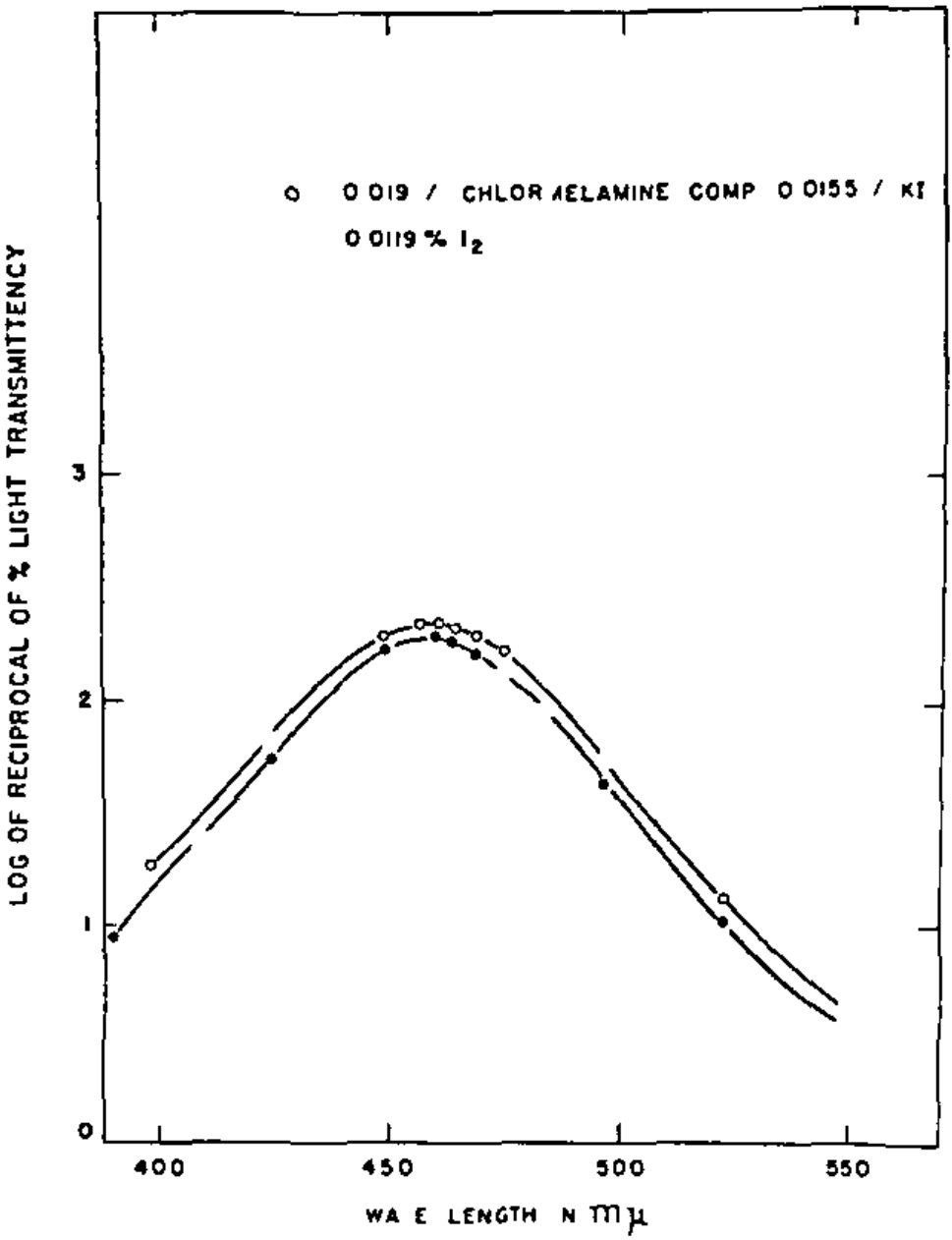
T bl h l g c ce are xp s d t t bl hlo

Form of titrable iodine present in the solution of iodized TCM As shown in a previous report titrable iodine may exist in dif ferent forms in solution and different forms possess different germicidal efficiencies Hence, it is essential to know what form of titrable iodine occurs in the solution of the iodized TCM composition The absorption spectrum of a solution containing 0 1 per cent TCM composition and 0 0155 per cent KI (to yield a theoretical I_2 concentration of 0 0119 per cent) and the spectrum of a 0 0119 per cent I_2 solution were determined with a Beckman spectrophotometer Results of these determinations are presented in Figure 2

Because the two absorption spectra are almost identical, it is apparent that essentially all of the titrable iodine in a solution of the iodized TCM composition exists as I_2

Maintenance of residual I_2 in the presence of 0 2 per cent pep tone in solutions containing iodized TCM composition or ele

mental iodine Since the germicidal efficiency of the iodized TCM composition depends chiefly on the I formed in solution (see below) it is essential to know the maintenance levels of residual I alone Hence the residual I_2 in a solution of 0 1 per



F gur 2 Ab orpt p t a of 0 019 p nt hl m lam mp t +0 0155 p t KI lut on a d 0 0119 pe t I lut at 5 C

cent TCM composition with 0 019 per cent KI in the presence of 0 2 per cent peptone was determined photometrically after varying standing periods at 25 C A parallel determination was made with a 0 0125 per cent I solution Since iodination of the tyrosine in peptone results in the formation of brownish iodotyrosine and/or diiodotyrosine which may interfere with the determination $CHCl_3$ was used to extract the I from each

sample before making the determinations Results of these de terminations are shown in Table 3

TABLE 3 *Residual I in a 0 0125 per cent I solution and in a solution of 0 1 per cent TCM composition with 0 019 per cent KI after contact with 0 2 per cent peptone at 25°C*

Standing time in minutes	Residual I_2 (ppm)			
	0 1% TCM and 0 019% KI		0.0125% I_2	
	5° C	25° C	5° C	25° C
Start	124	124	125	125
30	120	85	88	66
50	118	83	65	38
95	112	73	55	35
120	110	70	50	33

Table 3 demonstrates that in the presence of peptone the iodized TCM composition maintained on the average, twice as much residual I_2 as that maintained by the pure I_2 solution The higher residual maintained by the former is attributed to the fact that as I_2 is reduced to iodide by organic matter the iodide is oxidized back to I_2 by residual chlorine Since the iodine in both iodotyrosine and diiodotyrosine is not available for conversion to I_2 by the TCM it is probable that the residual I_2 maintained in the solution of iodized TCM composition would be still higher under field conditions where tyrosine is unlikely to be present at such high concentrations

Efficiencies of germicidal rinse compositions At a meeting of the Subcommittee on Food Supply of the Committee on Sanitary Engineering and Environment of the National Research Council in Washington D C 10 11 January 1952, it was recommended that a 99 999 per cent destruction of *E coli* within 20 seconds should be used as a standard in evaluating the germicidal effi ciency of a rinse composition for military use To provide an even wider margin of safety for field use the bactericidal effi ciency standard used in the present evaluation was 99 999 per cent destruction in 15 seconds or less

Since determination of the rate of destruction of amoebic cysts by the most probable number method is too time consuming to be practical the cysticidal efficiency standard was set as negative cultures in 15 seconds or less As indicated previously with a cyst density of 50 per ml in a 1 liter sample a negative cultu indicates a 99 998 per cent destruction

At the outset no standard was established for [illegible] ciency

Initially the bactericidal efficiencies of several germicidal rinse compositions were evaluated against *E coli* under the test conditions described From the data obtained the per cent de struction in 15 seconds was interpolated and is presented in Table 4

T E 4 // en / on rm po on uc on / l on p /
ond on

Co po	P	°C	C or l onc DD		P d uc s ond
			T l	R d l	
TCM		2	00 75 70	13 6- 63 8/	30-60 0-99 98
			3	99-1 3	99 999 99 99 99
T l			20 2	85 99	99 999 99 999 99 8-99 99
TC l		2	75 2	3 05 109	99 999 99 999 99 999
			3	68 86 3	90 4 9 99 999
l D l			36 3	2 5 3	0-80 90 99 999
od					96-99
			90 1	96- 5 5	99 999 99 999 5

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on on ka og

Table 4 shows that when tested in the presence of 300 ppm of bicarbonate alkalinity and 0 2 per cent peptone after a 2 hour peptone contact time only the two iodized TCM compositions satisfied the bactericidal requirement at all three temperatures In some of the tests with the two improved DDH compositions satisfactory results were obtained at 50 C but not at 5 C The bactericidal efficiency of iodine composition I was unsatisfactory at 5 C and 50 C and composition II was satisfactory only at 5 C and 25 C

The cysticidal efficiencies of the two iodized TCM composi tions were then determined For comparison a TCM composi tion and the two improved DDH compositions were included in these experiments The results presented in Table 5 demonstrate that only the two iodized TCM compositions fulfilled the cysticı dal requirement Of these two compositions only the one which contained 0 019 per cent KI was consistently satisfactory in per formance at all temperatures

Preliminary viricidal tests carried out with the type 2 polio virus revealed that relatively unimpressive amounts of destruc tion are obtained at 5 C to 50 C in 30 seconds with the iodized

TABLE 5 *Cysticidal efficiencies of five germicidal rinse compositions under specified test conditions*

Composition	Per cent in solution	Temperature (C)	Titrable halogen (ppm)		Time in seconds for negative cultures
			Initial	Residual	
TCM	0 1	5	202	98 128	3 000 3 600
		25	202	110 151	240 300
		45	202	88 98	30 60
TCM KI	0 1 0 017	5	202	98 132	15
		25	202	101 102	15 30
		45	202	93 106	15
TCM KI	0 1 0 019	5	220	119 152	15
		25	220	114 154	15
		45	220	103 111	15
IDDH I	0 1	5	359	282 305	>900
		25	359	165 176	<300
		45	359	64 75	30 60
IDDH II	0 1	5	373	288 305	>900
		25	373	231 243	<300
		45	373	80 88	30 60

Co ce tr ti n f hal g ns ar pressed s t t able hlort e in sol t ons co t i ing m re than o e halogen

TCM compositions and that even poorer results are obtained with the TCM and DDH compositions While the presence of signifi cant amounts of extraneous organic matter in the crude virus sus pensions may have reduced the efficiencies of these composi tions there were definite indications that the virus is more diffi cult to destroy than either *E coli* or amoebic cysts The viricidal part of the evaluation therefore was devoted to determining how changes in TCM and iodide content would affect the viricidal ef ficiencies of the iodized compositions and whether enteroviruses differ in resistance to these compositions Again for comparison the TCM compositions were included in the study These evalu ations (Table 6) demonstrate clearly that both type 1 poliovirus and type 7 echo virus are less resistant than coxsackie B1 virus to destruction by the TCM II KI composition (25 per cent titrable chlorine 0 039 per cent KI) Coxsackie A2 virus was destroyed at a rate comparable to that obtained with coxsackie B1 virus It is clear that the iodized TCM compositions are considerably more viricidal than the TCM compositions

TA LE 6 V / // / C en od d T po ue \0 pp on

Comp	ab)	er		on (	d ct on on 5 C	5 C
						35
	2 5					50-60 5
	5				30	0- 0-
TC\ 1			1		6	99 90 93
TC\ 1					60-6 3	98 99 5 9 0 9
				0	3 4	99 6-99 9 99
C KI	5	3			90 50-60	99 999 99 900
					90 60	99 90 99 95

Th

However if either coxsackie virus had been designated a stand ard test organism the maximum destruction obtainable with the iodized compositions in 15 seconds at 5 C would have been 70 per cent in the absence of peptone and 40 per cent in the pres ence of 0 2 per cent peptone In 15 seconds at 25 C no more than 99 9 per cent destruction was obtained in the absence of peptone and no more than 99 per cent destruction was obtained in the presence of peptone The composition containing 0 039 per cent KI was more viricidal than the composition containing 0 019 per cent KI and the compositions containing 25 per cent titrable chlorine were slightly more viricidal than those contain ing 22 5 per cent titrable chlorine

Residual chlorine (mg/l)	Corrected chlorine dose as I_2 (mg/l)	Percent destruction in 15 seconds
0.0	0.5	99.99
0.1	1.1	99.999
0.2	1.3	99.99
0.5	1.6	99.99
1.0	2.0	99.9
1.0	2.0	99.99
1.0	2.0	99.99
1.0	2.0	99.99
1.0	2.0	99.99
2.0	3.0	99.99
2.0	3.0	99.99
2.0	3.0	99.99
2.0	3.0	99.99
2.0	3.0	99.99

*Maximum solubility of I_2 in water at 5°C.

It is expected that virus destruction correlates more closely with the corrected I_2 residual than with the measured chlorine residual. This is indicated by the fact that the 99 and 99.9 per cent destruction levels obtained in 15 seconds with 1.0 and 2.0 mg/l of corrected I_2 respectively appear close to the destruction levels observed with the iodized TCM concentrations containing 0.013 per cent and 0.023 per cent KI (in the absence of peptone) which should have a theoretical 1.0 and 2.0 mg/l I_2 respectively.

It is apparent that a unit with a maximum amount of KI the iodized TCM combination cannot destroy significantly more than 99.99 per cent of coxsackie B_5 virus in 15 seconds at 5°C. Since the solubility of I_2 is less at 5°C than at 25°C and because the value of Q_{10} (the temperature coefficient for a 10-degree change) is probably greater than 1.0 for the destruction of coxsackie B5 virus by I_2, the rate of virus destruction at 5°C

is probably considerably lower than that obtained at 25 C After a 2 hour contact with 0 2 per cent peptone the reduced I residuals would inflict even less destruction on the virus This reduction explains why the iodized compositions destroyed at 5 C in 15 seconds only 60 to 70 per cent of coxsackie B1 virus in the absence of peptone and less than 20 to 40 per cent of the virus in the presence of 0 2 per cent peptone It also explains why at 25 C only 92 to 99 per cent of the virus was destroyed in 15 seconds in the presence of 0 2 per cent peptone

SUMMARY AND CONCLUSIONS

On the basis of data presented the following outstanding features are summarized

1 TCM is one of the more suitable N chlor compounds for use in a germicidal rinse composition because of its high stability moderate solubility and relatively low affinity for organic matter The TCM compositions described in this report fulfill the stability and surface tension requirements and maintain a satisfactory pH in the presence of bicarbonate alkalinity up to 300 ppm However the bactericidal cysticidal and viricidal activities of the TCM compositions fall far short of that desired especially at 5 C

2 Iodide incorporated into the TCM composition greatly increases the germicidal efficiency of the composition without altering its other properties When 0 019 per cent KI is used in a 0 1 per cent solution of a TCM composition (200 to 250 ppm titrable chlorine) in the presence of 300 ppm bicarbonate alkalinity and 0 2 per cent peptone 99 999 per cent destruction of *E coli* and an estimated 99 998 per cent destruction of *E histolytica* cysts are obtainable in 15 seconds at 5 C 25 C and 45 C Fifteen second destruction of coxsackie B1 virus however is not much greater than 30 per cent at 5 C and less than 99 per cent at 25 C The bactericidal data are less consistent when the KI content is reduced to 0 017 per cent Viricidal results are improved when the titrable chlorine level is increased to 250 ppm and the KI concentration is increased to 0 039 per cent In 15 seconds in the presence of 0 2 per cent peptone the latter compound can destroy 60 to 70 per cent of either type 1 poliovirus or type 7 echo virus at 5 C and 99 9 to 99 95 per cent at 25 C

3 Due to the limited water solubility of I the greatest level of destruction obtainable with this halogen against coxsackie B1 virus at 25 C in the absence of peptone was 99 99 per cent

At the present time the iodized TCM composition containing 250 ppm titrable chlorine and 0 039 per cent KI appears to represent the upper limit that can be developed for use as a germicidal rinse under the prescribed requirements If a disinfectant more powerful than I (e g HOCl) is used in the composition the stability of the composition both on storage and under the specified testing conditions becomes questionable The iodized

TCM composition, therefore, is presently the most promising one available for military uses However, if coated KI is used in the composition, the stability of the composition must be thoroughly studied

Because time is no problem in the rinsing of fresh vegetables and fruits, the 15 second germicidal performance required of the composition in mess gear sanitation is resolved in the former operation Since a 6 to 8 minute contact will facilitate 99 999 per cent destruction of coxsackie B1 virus even at 5° C in the presence of 0 2 per cent peptone, a 10 minute soaking of vegetables or fruits should provide a wide margin of safety provided that all the surfaces are exposed to the rinse

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REFERENCES

1 M J C Cha g S L Fa r G M nd C n nt O H Jr Di infecti n of d k g w t r und field co ditions *Indust and Eng Chem.* 45 1013 1015 May 1953

2 F G M Chang S L a d M tti J C Final Report on Dini fection of W t d Rel t d S b t nc s t th Committ M dic l Rese rch Nation l Re rcl C il S ti 9 77 Dec 1945

3 F r G M. Ch ng S L nd Morris J C A nu l S mm ry Report on C tml c d D h W shing t Off of Qu rt mast r Ge eral U S Army S ction 9 81 1949

4 Ch g S L Stud o E d m b hist lytic d stru tion of cyst of Fn l m eba h t lyt by hyp hl t l t chl mi in tap w t r nd g s u chlorine in p w t f ry g d g e of p ll ti *War Med.* 5 46 55 Jan 1944

5 Ch g S L B g G Bu ch K A St s R E Cl k N A nd K bler P W Appl t on of m t p ob bl numb r m th d for st m ti g conc ntr t o of mal u by t u cultur t h iq *Vir l gy* 6 27 42 Aug 1958

6 J M. F (B th sd Md) a d N wt W L Sur i l of cyst f E d m b h t lyt in w t t temp ture betwe 45 C d 55 C *Am. J Top Med.* 30 53 58 J n 1950

7 Ch g S L Kin t es in th m destru t on of cyst of E d mo b hist lytica in w ter *Am. J Hyg* 52 82 90 J ly 1950

8 B g G d Chang S L F l R port Viricid l Effi i ncy of Germicid l R e F rm l tio to the Off ce f th Quart rm ter G ner l U S Army Section 6 15 1956

9 Ch g S L U f acti iod n water disinfectant *J Am. Pharm. A* (S i ntif c Ed) 47 417-423 Jun 1958

SURGICAL CARE OF THE CONFEDERATE STATES ARMY

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ON April 2 1865 a courier handed President Jefferson Davis a note as the President of the Confederate States of America was attending services at St Paul s Church in Richmond Virginia President Davis flushed portentously rose to his feet and left the church Petersburg had fallen the siege of Richmond had been lost Soon the exodus from Richmond began and with it the southern end of the city was fired Tobacco warehouses burned as did two important houses which with their contents were completely destroyed One of these was the office of Surgeon General Samuel P Moore and the other was the house adjacent in which were stored records and reports pertinent to his office that had been accumulating for the four years of the War Between the States Following the loss of this invaluable material the preparation of an adequate history of the Medical Corps of the Confederate States Army or even of a complete roster of its personnel became an impossible task

THE SCOPE OF THE PROBLEM OF THE MEDICAL CORPS OF THE CONFEDERATE STATES ARMY

The Medical Corps of the Confederate States Army was made up entirely of general practitioners who had served in all parts of the South during their professional lives in the preceding period of unbroken peace and this left them totally unprepared for the vast amount of traumatic surgery which they were to face Little too did they know of field sanitation To add to their problems the armies collected hastily to repel invasion were fed defi

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F m h C ll g f Phy and Surg Col mb U y D S ark A stan P f f Cl l Surgery d A d g S g h g f Pl Surg y S L k H p 1421 W 113 h S N w Y k N Y P d b f h Se Hu or l d C l l M d t Th N w Y k A d my f M d M h 27 1957 (P f h p p w p d b f th N w Y k C l W R und T bl Ap l 9 1957 and b f h An ual Sp g Clin \ f lk (\ ) C y M d l S y M h 28 1956) Th w k w d d by g f m h W Al J F d d USPHS G N D-319

R p d w h p m f m *Bull t f th New York A ademy f M d ci* 34 387 407 Jun 1958

ciently were poorly equipped and were paid almost not at all However, in spite of virtually no surgical equipment and no text books on surgery this small but valiant corps of army surgeons with their assistants and their ancillary corpsmen, made an heroic and enviable record throughout the horrible four years of suffering which became an inseparable part of the army of the South How well the leaders of the Medical Corps of the Confederate States Army overcame these basic obstacles will be seen However the statistics of diseased and wounded when compared with those of the North bring this story into focus with accent upon its epic proportions

Confederate forces actively engaged in the four years War Between the States numbered no more than 600,000 troops This small force faced a total number of 2 800 000 soldiers mustered into the Northern Army or approximately four times the fighting contingent of the Confederate States Of these 600 000 Confederate troops, 54,000 were killed outright and approximately 200 000 died either from wounds of battle or from disease Another 200 000 were lost to the Confederate States Army as prisoners of war because of the policy of non exchange of prisoners adopted and enforced by the United States Approximately 100,000 were discharged because of disability from wounds, disease or desertion during the war years Of this small force horribly decimated at the end approximately 3 000 000 cases of wounds and disease were cared for by the Medical Corps of the Confederate States Army Thus on an average each Confederate soldier was disabled by wounds and sickness about six times during the war[1] On April 9, 1865 as the war ended General Lee could not muster 10 000 men who were fit for active warfare from his former great army of northern Virginia Dick Ewell surrendered with only 8 000 men to Phil Sheridan

In contrast to the statistics of killed and wounded is the shockingly high figure of losses due to illness in the field The troops of the Confederate States Army were drawn from rural districts and had never been exposed previously to contagious illnesses, thus exposure from crowding made contagion a frightful scourge of the army Measles a disease regarded lightly under ordinary conditions struck terror in the Civil War camps for its sequelae were pneumonia and phthisis Eruptive diseases, glandular affections tuberculosis capillary bronchitis typhoid and malarial fevers, diarrhea and dysentery were the chief causes of mortality and deterioration of strength in the Confederate States Army [2] Aiding and abetting natural exposure of this type were fatigue deficient food which was often spoiled clothing which was often ragged or lacking no water purification poor shelter exposure to sudden changes of temperature and to dampness and wetting as well as indifference to or ignorance of field sanitation

DRUGS AND INSTRUMENTS

The desperate shortage of medical supplies and instruments which resulted from the Union blockade necessitated heroic improvisations To supply medicines which were declared by the enemy to be contraband of war our Medical Department had to seek in the forests for substitutes and to add surgical instruments and appliances to the small stock at hand as best they could When Fort Sumter was fired upon the entire male student body of the University of South Carolina joined the Confederate States Army while the faculty became the pharmaceutical house for the Confederate States Medical Corps The principal text in pharmacology was a war time book prepared by Dr Francis Peyre Porcher Professor of Materia Medica and Therapeutics at the medical college in Charleston This text was entitled Resources of the Southern Fields and Forests Medical Economical and Agricultural Being Also a Medical Botany of the Southern States with Practical Information on the Useful Properties of the Trees Plants and Shrubs

The number of skilled instrument makers in the Southern States was small There were however purchasing agents in London and in Nassau whose duty it was to purchase and forward supplies which were otherwise completely unobtainable In addition raids upon the relatively unguarded Northern supply lines were frequent during the early part of the war at a time when the cavalry of the South was superior One such raid netted the cavalry of Nathan Bedford Forrest a cache of medical supplies estimated to be worth $150 000 Too smuggling of quinine and morphine was common by southern ladies who secreted these drugs amongst their many petticoats as they crossed the lines

Texts Textbooks were scarce and scientific intercourse with foreign countries came to a virtual halt To fill this intellectual gap two excellent manuals of military surgery were published one in 1862 and one in 1863 Beginning in 1864 the Confederate States Medical and Surgical Journal was issued monthly for fourteen consecutive numbers This reached the hospitals and occasionally got into the field In this excellent journal original articles were printed with abstracts of recent foreign periodicals offering the reader an epitome of military medical experience in the North and the South as well as of the current literature in peaceful European countries

ORGANIZATION OF THE MEDICAL CORPS

Shortly after the outbreak of the War Between the States President Jefferson Davis appointed Samuel Preston Moore of Charleston South Carolina the Surgeon General As Surgeon General of the Confederate States Army Moore organized an efficient medical and surgical department It was necessary for General Moore to

establish large pharmaceutical laboratories to convert indigenous plants and barks into drugs which could be used by the Medical





F gure 1 The most colorf l surgeon in the Confederate States Army was Hunte Holmes McGu e M D While a medical student in Ph ladelphia, McGuire led a revolt of about 300 Southern med cal st dents uho left schools in the North fo ones in the South at the time of the John Brown episode As Med cal D ecto of Stoneuall Jackson s co ps McG e uas held n high esteem by his commande uho mentioned h m often in his d s patches. It uas McGui e s sad task to have to amputate Gene al Jackson s arm after the latte uas wounded accidentally at Chancello sville The op e at on uas s cce sf l but Jackson d ed of a complication upon h s e ghth postop at v day

McGu e uith Jackson uas respo ble fo f st elease of captured Un on Army surgeons a pract ce—adopted late by both the North and the South—uhich a tedat d fo mat on of the Red C oss. McGuire worked ha d n the post war p od to e adicate from history books the sto y of the Civil Wa which had been slanted touards the No thern po nt of uiew A leade in his f eld a well as a maste surgeon McGuire was honored by being made presi dent of the Southe n Surg cal Association A M A and the Ame ican Surgical Assoc at on.

F gure 2 Capta n Sally B Tompkins, C S A uas the only woman commis s oned by the Confederacy A ph lanthropi t and human ta an, Sally Tomp k ns established and mainta ned financ ally the Robertson Hospital in Rich mond uh ch made an enviable ecord. An executive o der was issued early n the wa placing all private hospitals unde gove nment control but be cau e th s o de threaten d to lose the Confede acy a needed benefactor P esident Davis comm ssioned Sally Tompk ns a capta n n the Confederate States A my Miss Tompkins accepted the commission but refused to place he self on the payroll

Corps It was necessary for him to promote and administer the manufacture of surgical instruments and appliances It was he who established a large and efficient hospital service and a field ambulance corps Jefferson Davis stated It would be quite be

yond my power to do justice to the skill and knowledge with which the Medical Corps performed their arduous task I regret that I have no report which would enable me to do justice to the officers of his [Samuel Preston Moore s] corps as well in regard to humanity as in their professional skill

The Quartermaster Branch or purveyor section of the Medical Corps was established by Dr Thomas H Williams



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F gur 3 J B B M D D D S wa a ont t d t t f m Ch tt oog uh t max ll ry w g vol t on d th ca f j w f t d p ag d m d ar of th jur s.

F g 4 S p t d t of H p t l of th C S A S H St t M D had be barg of G d H sp t l Nashv ll a d f ho p tal Ch tta-nooga, and pro d h m lf an xt m ly bl and t tf l adm t ator It was st t d th t bec of St t m d al ga t on J h to army was t gth d by at l t a full d of f ght g m n. St ut b m M d l D t of the H p tal of the D p tm t a d Army f T nn

Although an active roster of the medical corps is not available usually each separate command engaged in the field had one surgeon and two assistant surgeons so if one added units not in the field to those actively engaged in combat it is estimated that there were approximately 2 000 surgeons and 4 000 assistant surgeons or a total of 6 000 which comprised the Medical Corps of the Confederate States Army

More than 3 000 000 cases of wounds and disease were cared for by the Medical Corps in the Confederate States during the war in addition to which were the 270 000 Union soldiers held as prisoners of war The efficiency of the department is shown in

part by the fact that the percentage of deaths of Union prisoners of war in the Confederate prisons was little more than 9 per cent while the percentage of deaths of Confederate prisoners of war in Northern prisons was more than 12 per cent."

At the outbreak of the war the organization of the Confederate Medical Department was identical with that of the United States Army. There was a surgeon general with the rank and the pay allowances of a brigadier general and there was a medical director in each army corps or department with the rank of colonel. In each division was a chief surgeon (who consolidated reports sent



Figure 5. With 8400 beds the Chimborazo Hospital is reputed to be the largest ever to exist on this continent. Built upon heights of the same name Chimborazo, with the Jackson and Wind Hospitals, was one of three large hospitals in Richmond. A vast hospital center Richmond had 13 named and 27 numbered hospitals within its environs.

in by senior surgeons), regiments had a surgeon who was a major, and an assistant surgeon a captain assigned to them. A battalion and sometimes a company of artillery had a captain as an assistant surgeon assigned to them. The services of contract surgeons were provided for. These were civilian physicians who served with pay and allowances of a second lieutenant.

Medical officers were charged with the examination of recruits who were stripped so that the "free use of their limbs could be observed." It was to be noted whether or not the "chest was ample and whether the hearing, vision and speech of the recruit were perfect. The recruit was to have no tumors, ulcerations, extensively cicatrized leg, rupture or chronic cutaneous affections. He should not have received any contusion or wound to the head previously. It was to be ascertained whether or not the recruit was a drunkard or subject to convulsions or infectious disorders. In giving certificates for discharge [illegible] medical officers were cautioned [illegible] of the illnesses (such as epilepsy, [illegible] tism, derangement of the urinary [illegible] or purposely produced [illegible]

and in spite of the induction physical examination many women masquerading as men were inducted into the service

The duties of the surgeon included care of the sick in camp and establishment of field hospitals upon the march As soon as it was learned from the commanding officer where the troops were to engage in combat a site for a hospital was chosen preferably behind a hill or in a ravine for defilade approximately one half to one mile in the rear of the line of battle The wounded were brought from the front on stretchers or in ambulances by members of the regimental band which comprised the infirmary detail whose modern counterparts are the Company Aid Men The combined medical staff of the brigade or division performed necessary operations The assistant surgeons were in the rear of the regiment but in front of the field hospital giving first aid to the wounded The dressing station was the forerunner of the Battalion Aid Station Assistant surgeons adjusted and temporarily cared for fractured limbs controlled hemorrhage gave drugs to relieve pain and made certain that the wounded were carried promptly to the hospital by the infirmary detail or ambulance corps

The hospital steward with the pay and rank of a sergeant was in charge of hospital stores Usually he was an undergraduate of a medical college with previous experience in the handling of drugs Cooks and nurses were under the steward and were subject to military control Ward masters were in charge of personal effects of the patients In a general hospital there was one steward one nurse and ward master plus one nurse to tend patients One laundress was provided to 20 and one cook to 30 patients

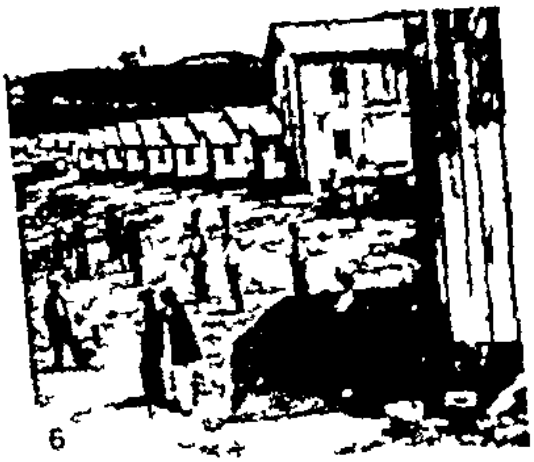
The uniform worn by the Medical Corps was similar to that of the line officers except that the facing of the collar and cuffs was black while that of the infantry was light blue that of the artillery scarlet and that of the cavalry buff In front of the cap of the military surgeon were the gold letters M S (Military Surgeon) flanked by two olive branches

It was felt by some that because of the easy manner in which commissions for medical officers were obtained many were not qualified However commissioning boards were established which gave practical examinations to prospective medical officers as well as to those already in the service The medical knowledge moral habits and physical qualifications of the candidates were examined One such board was headed by Dr Chaille later Dean of Tulane University who stated The incompetents were exceptions to the superior merit of the vast majority of the members of the Confederate staff It was felt generally that the students of the South who had graduated from medical college prior to the onset of the war were better trained than those who were graduated in subsequent years Dr Samuel H Stout Medical Director of the Department of the Army of Tennessee said When I at

tended lectures in Philadelphia more than half a century ago the number of students in the two schools there [University of Pennsylvania and Jefferson] was a little more than 1000. More than half of them were from the Southern states."

RATIONS AND FIELD SANITATION

The supply of food and water for the troops was established by the Confederate command and promulgated in Chisolm's *Manual of Military Surgery*.[2] Methods of clearing turbid water in the field and of making it potable were suggested. Stagnant or ditch water



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Figure 6. A general hospital in the Confederacy. Three of this were constructed, composed about equally of buildings and Sibley tents of the type [illegible]. Patients were segregated according to their state of cleanliness and gender in accordance with a law of Representative James Farrow of South Carolina in 1862 which became law. This segregation was intended to mitigate feelings of [illegible].

Figure 7. With defeat at Petersburg in April 1865 the Siege of Richmond was lost. Rather than let the city fall intact into Union hands Richmond was fired. About a tenth of the city burned but tragically for the historian of this chronicle the Surgeon General's office and all scientific records of the Medical Corps of the Confederate States Army were among those that were destroyed. Because of this the story of medicine and surgery in the Confederacy cannot be told authoritatively. A complete roster of the Medical Corps or even its strength is not known.

was to be boiled with a lump of charcoal. A piece of alum was thrown into turbid water to settle it and remove the deposit. It was suggested that water for large units be filtered through a barrel filled with straw.

One ration consisted of three quarters of a pound of pork bacon one and a quarter pounds of fresh or salt beef, 18 ounces of bread or flour 12 ounces of biscuit and one and a quarter pounds of corn meal. As a result of discoveries made during the Crimean War, it was suggested that in the temporary absence of fresh vegetables lime juice or citric acid be used to prevent scurvy.

Sanitation Unhappily many regimental camps were accumulations of filth of every description the odor of which could be detected from great distances A strong appeal was made to the men for the use of unit latrines It was suggested that latrines be placed at least 100 yards from the tents and on the down wind side It was suggested also that the privies be established over water This was before the advent of bacteriology and hence pollution of the water supply by sewage went unrecognized and was partially responsible for the dreadful morbidity and mortality from diarrheic and dysenteric diseases Regulations dictated that latrines were to be prepared immediately upon the establishment of camp and the men were compelled to use them under penalty Penalties were rarely imposed however and the inconvenience of travelling to a distant latrine was avoided with relative ease by using the camp site

Field pack The best check list for the field pack was that of Stonewall Jackson whose men covered such amazing distances on forced marches Jackson insisted that full field equipment consist of two flannel shirts two pair of woolen socks flannel drawers and shoes one pair of gaiters a small case of needles and buttons for mending clothes a shoe brush with blacking a comb and hair brush a tooth brush one piece of soap a sponge for washing the body and a towel for drying it two pocket handkerchiefs an overcoat a heavy blanket and two yards of India rubber cloth to protect the soldier from inclement weather Jackson stated When a person has not more than one change of raiment the strong impression of *necessity* obliges him to prepare for the return of want When there is a superfluity the necessity does not present itself so forcibly and hence the dirty clothes are crammed into the knapsack where they accumulate in quantity not obliging the individual to recollect that they are *not* for use unless they are washed [2] Jackson made no mention of shaving equipment for he felt that Every soldier in the field should allow his beard to grow [as] it protects his throat and often prevents lung diseases [and] catarrhal afflictions a heavy mustache is known to protect the wearer to a certain extent from malarial influences acting as a sieve to the lungs [2]

ANESTHESIA THE CARE OF WOUNDS

Ether nitrous oxide and chloroform had all been discovered and used extensively prior to the War Between the States Chloroform had been used 25 000 times previously in the Crimean War with no unfavorable results and was the anesthetic agent of choice in the War Between the States Dr Hunter McGuire Medical Director of Jackson s Corps collected 15 000 cases of chloroform anesthesia during the war without a single death Although the blockade of the Southern states was most effective chloroform quinine and morphine were never completely lacking in the Confederacy during the war

Preoperatively the patient was given a light nutritious meal in the hope that the stomach would then be empty and the patient strong Brandy was the premedication of choice The patient was placed in the supine position and chloroform was poured upon a







Figure 8. While the North was experiencing growing pains in its Medical Corps and was commanded successively by four Surgeons General the South was blessed with an incredibly astute and efficient Surgeon-General in the person of Samuel Preston Moore of Charleston. Moore had been a surgeon in the old army but had resigned to join the Confederacy Although there were several "paper Surgeons General serving initially for several weeks, Moore organized an astonishingly effective Medical Corps in a South that had no surgical instrument makers no textbooks of surgery no manufacturers of prostheses and no drug houses.

Figure 9 James Brown McCaw M D a youthful professor of chemistry and pharmacology at the Medical College of Virginia was given the task of building and administering the Chimborazo Hospital in the hospital center of Richmond. McCaw was editor of the Confederate States Medical and Surgical Journal as well and during this period of intense activity six scientific articles appeared in this journal from the staff of his own Chimborazo Hospital

Figure 10 J J Chisolm M.D wrote one of the two badly-needed textbooks on surgery used by the Confederate Medical Corps. His A Manual of Military Surgery promulgated rules of field sanitation as well as principles of operative treatment of traumatic wounds.

cloth cone The anesthetist and the assistant were completely silent during the induction Corneal reflexes were tested to determine complete anesthesia of the patient The pulse, respirations and color of the patient were scrutinized closely If the airway became obstructed the tongue was seized (by a hook tenaculum forceps or fingers) and was brought forward

Asepsis Antisepsis and asepsis were not understood at the time of the War Between the States, as the discoveries of Lister came ironically, in 1865 as the war ended Instruments were always unsterile and wounds were cleaned with an sponge which was used indiscriminately in all was the appearance of suppuration or "l fourth day that its appearance was thought w

was resorted to 12 per cent recovered from fractures of the proxi mal third of the femur 40 per cent recovered from fractures of the middle third and 43 per cent recovered from fractures of the distal third Consequently early in the war the rule was established of amputating the extremity if it were injured seriously for it was thought that primary operation gave the best chance for recovery Because of this surgical premise thousands of limbs were sacri ficed that could have been saved at the present time In fractures of the upper third of the femur the dangers attending amputation were so great that it was questionable whether amputation was indicated In gunshot wounds of the upper extremity as much of the hand as possible was preserved if amputation were resorted to It was suggested by J S Wilson that resection of the proxi mal segment of the humerus be performed following fracture thus allowing the muscles of the upper arm to function in an unimpaired manner although reducing the arm to a mere flail

In standard methods of amputation the integument is divided by circular elliptical or hemi elliptical incisions or by a com bination of the first and last forms If the amputation were per formed using only the knife it was spoken of as having been per formed in contiguity If section demanded the use of the saw or bone biting forceps it was said to have been performed in continuity

James Bolton wrote during the War Between the States of the unnecessary loss of extremities stating that amputation was only an exchange of death by exhaustion for death by shock If the limb be saved it will almost certainly be shortened and fre quently misshapen and this may happen to such an extent that the limb may be an incumbrance As a result of his dilemma Bolton devised an ingenious form of extramedullary fixation in 1864 Through two stab wounds in the soft tissues holes were drilled in the cortex of the long bone Rods were screwed into these holes A longitudinal rod was then passed at right angles through the two upright rods outside the integument parallel to the shaft of the bone This method was the antecedent of the present day Roger Anderson apparatus

An ingenious method of splinting was devised by Professor Nathan R Smith of Baltimore consisting of bandaging the limb to an anterior wire splint and suspending the extremity from an overhead frame The splint was made of wire and easily applied

Statistics upon amputations reported in 1864 in the Confederate States Medical and Surgical Journal stated that there was a mor tality from 1814 operations for amputation resection and dis articulation of 34 per cent There was a mortality from primary amputation for fracture of the femur of 38 per cent and a mortality of 73 per cent from secondary amputation In amputation of the leg there was an attendant mortality of 30 per cent for primary amputations and 49 per cent in secondary amputations In ampu

tations of the upper arm there was a 14 per cent mortality for primary amputations and 37 per cent for secondary amputations, primary amputation of the forearm carried with it a 12 per cent mortality and a secondary amputation a mortality of 22 per cent

By 1864, there were nearly 10 000 amputees in the Confederate States Army Although artificial limbs were being manufactured



Figure 12 Because of the dearth of textbooks upon medicine in the Confederacy Surgeon General Moore published the Confederate State Medical and Surgical Journal. This excellent journal was issued monthly for fourteen numbers until March of 1865 Only two libraries in this country possess all fourteen issues of this journal

at that time for lower extremity amputees the manufacturers could supply only one tenth of the demand Ideally amputation stumps were left long enough to secure abundant leverage were well covered with soft tissues and were shaped like a truncated cone The socket of the artificial limb was well padded and was fitted to the stump so that every portion of its periphery was in contact except the tip of the stump "Artificial limbs resemble those of the resecta except that the *skeleton is without* Their structure generally is of wood covered with leather but sometimes of a heavy wire cloth Strong and well secured joints at points corresponding with those in the host's limb, move with ease and exactness through the medium of cords levers and springs of metal or guttapercha the whole being in symmetry and function, a faithful representation of the natural leg with the exception that the artificial leg, being but the work of man is a more simple apparatus "[14]

The care of abdominal and chest wounds Approximately 20 per cent of the wounds incurred were of the torso Abdominal wounds which perforated a hollow viscus were almost uniformly fatal Although the pathological physiology of sucking wounds of the chest was imperfectly understood Assistant Surgeon Howard of the United States Army publishing in the New York Medical Times suggested that gunshot wounds of the chest be treated by sealing hermetically the wounds of entrance and exit thus preventing the additional entry of air into the pleural cavity which would collapse the lung

The care of wounds of the head and neck Ten per cent of the wounds of battle were of the head and neck It was known during the time of the War Between the States that the great vascularity of the structures of the face promoted healing and that bony fragments attached by periosteum would survive Hence debridement of bony spicules in the face was reduced to a minimum It was known also that because of the vascularity of the face serious hemorrhage might accompany all injuries in that area

Fractures of the mandible were treated early in the war with a pasteboard splint designed by S H Stout Medical Director of the Army of Tennessee The problem of oral secretions was troublesome although positioning of the patient was recognized to be important It was felt that swabbing the mouth frequently was an advantageous procedure

Stout who was in charge of hospitals in Tennessee utilized the services of Dr J B Bean a Chattanooga contract dentist who advocated splinting by intermaxillary wiring Dr Bean suffered from chronic rheumatism and hence was not upon active duty Both Stout and Dr Westmoreland professor of surgery at the medical college in Atlanta availed themselves of Dr Bean s skill in the treatment of gunshot fractures of the mandible It was never possible for Dr Stout to place a dentist in every hospital however a number of civilian contract dentists were employed as Dr Bean had been and funds were made available for them to work upon the problem of jaw fractures Dr Stout stated The result of their [Dr Westmoreland s and Dr Bean s] joint labors was so satisfactory so perfect in its adaptation to the treatment of gunshot fractures of the lower jaw that it had never before been equalled in the securing of comfortable articulation of the subject of the fracture while under treatment While inspecting the hospital Dr Westmoreland introduced me into what he called his broken jaw ward where I was greeted with great hilarity by the patients who were able to converse freely and distinctly with me

It was recognized that wounds of the face were often more distressing than dangerous because of the deformity that they caused The larynx and trachea were injured often and although trache

otomy was resorted to in cases of diphtheria it was not used in cases of traumatic airway obstruction by the Confederate States Medical Corps

It was known that because of the rich vascular supply, injuries to this region were often followed by dangerous primary or secondary hemorrhage For hemorrhage of an exsanguinating type pressure and powerful iron styptics were advocated It was stated, We find after every great battle the neck perforated by balls in every direction, accompanied by violent hemorrhage yet, with the first fainting brought on from shock and loss of blood, we find a spontaneous cessation of bleeding and the onward progress of the case becomes one of continued convalescence to perfect cicatrization "[2] McLeod reported on 128 cases with from slight to severe injuries of the neck with but four deaths [2]

Severe hemorrhage was treated by ligation of both ends of the severed bleeding vessel Enlargement of the wound was accomplished parallel to the long axis of the neck to avoid injuring important nerves or blood vessels [2]

It was known that if one carotid artery were ligated cerebral disturbance occurred in one fifth of the cases and in half of these (one tenth of cases) the outcome was fatal When both carotids were ligated simultaneously death always ensued If the two carotids were ligated several days or weeks apart there was no greater incidence of cerebral disturbance than when one carotid alone was tied

HOSPITALS IN THE CONFEDERATE STATES

Richmond became a vast collection of hospital during the war just as did Washington and Alexandria in the North There were twenty seven numbered hospitals in Richmond, and over fifteen named hospitals

Many of the casualties were nursed in private homes by the ladies of the Confederacy The total amount of care rendered or the number of cases treated will never be known Not only were the wounds of the Confederate soldiers cared for but their wants in clothing and food were satisfied as well A soldier taken into a private home often went forth after his convalescence wearing a beautifully patched uniform and underwear made from the linen of the women who sacrificed their own clothes and comfort for the benefit of the men at the front "[5] Numerous female philanthropists aided the Southern hospital cause In Nashville, Mrs Felicia Grundy Porter worked unceasingly to establish hospitals for the wounded As president of the Women s Relief Society of the Confederate States she arranged concerts and tableaux and so collected vast sums of money for the purpose of establishing hospitals and buying artificial limbs for Confederate amputees [4]

Another heroic Confederate woman was Sally B Tompkins who expended most of her ample resources establishing and maintaining the Robertson Hospital in Richmond This hospital was operated with a high degree of efficiency and established an enviable record admitting 1333 patients of whom only 73 died Soon after the war began an executive order was issued which placed all private hospitals under Government control Because it was feared that such an order would cause the Robertson Hospital to



F g 13 T pply g al t um t d d de perat ly the S uth m t d pur h g ag t Na d Lo don. I t m t t lik th abov uer the work of E gl h man fact re and u thro gh th bl ckade l ally th N rth proved t b a good ce f pply f m d al mat l as, th a ly part f the u th up n ca al y of the S uth bt d larg a be f qu pm t d d g fr m aid on Norther wagon t s—(F m h Auth C ll t)

lose its benefactor President Davis commissioned Miss Sally B Tompkins a captain in the Confederate States Army Sally Tompkins accepted this commission but refused to place herself upon the payroll of the Confederate States The commission given to Captain Tompkins was the *only one* granted to a woman by the Confederate States Army

The most famous Confederate hospital was the Chimboraza Hospital of Richmond with 8400 beds During its three years of operation it treated 76 000 patients of whom 17 000 were battle

casualties, with an over all mortality of approximately 9 per cent Shortly after the first battle of Bull Run before the Peninsular Campaign, the Surgeon General commissioned Dr James Brown McCaw, of Richmond, to establish and direct this hospital Still in his thirties McCaw already had been editor of the Virginia Medical and Surgical Journal for years, and was professor of chemistry and pharmacology at the Medical College of Virginia McCaw organized his huge hospital into five divisions according to states This hospital encompassed 150 buildings and 100 Sibley tents (of the tepee type) McCaw showed his genius for administration by buying several large tobacco warehouses in near proximity to the hospital which he utilized for the manufacture of soap The well seasoned lumber used for tobacco boxes, obtained by this purchase was utilized to build bedsteads, furnishings, and partitions McCaw used the factory hands for manual labor Further construction included large icehouses a Russian bathhouse a sewage disposal unit and a bakery Water wells were dug A brewery was established with a capacity of 400 kegs of beer to a brew McCaw maintained large herds of cows and goats, and to procure fresh vegetables, several canal boats plied the James River Valley purchasing fresh vegetables for the patients The total staff numbered 120, of whom 40 to 50 comprised the medical staff

During this period of intense activity McCaw found time to serve as editor of the "Confederate States Medical and Surgical Journal", and within the fourteen numbers of the journal, six scientific reports appeared from the staff of his own Chimboraza Hospital

BENEFITS FOR CONFEDERATE VETERANS FOLLOWING THE WAR BETWEEN THE STATES

Following the war most of the Confederate States recognized their obligation to assist the disabled and destitute war veterans and the most generous states, which led in veterans services were Louisiana Georgia, Florida, and Virginia Considerable sums of money were appropriated to furnish artificial limbs to indigent amputees In 1866 the state of Georgia appropriated $30,000 for this purpose, and $20,000 was appropriated by the Florida legislature in 1886 A pay scale for disability considered generous at that time (the state of Florida) consisted of annual payments of $150 for loss of sight or of both hands or feet, $30 for loss of one eye or loss of hearing Artificial legs costing about $80 were purchased for amputees, and $25 was provided for repair of a prosthetic extremity

This then is a short chronicle of a small valiant corps that labored though unprepared and undersupplied, to aid 3,000,000 sick and wounded in the last of the romantic wars in which the individual was yet a major factor Individual performances ranked

high and the figures of mortality and morbidity compared favorably with those of the adversary In lieu of official documents however the final history of the Medical Corps of the Confederate States Army must wait to be written when personal documents are released by families to the great libraries Then more able scholars than we will make their appraisals

REFERENCES

1 J J H *Th M d l H story / th Conf derat Stat Army and N vy* So h rn H l S ty p p
2. Ch lm J J *Manual / M l tary Surgery / h f urg h* C fed S Army w h an p- p di f h l d g l f h M d l D p m f h C f d S A my R hm d W d J b 1862
3 *Surg on Gener l Samuel P ston Moor and th Off ers / th M d al Department / the Conf derat Stat* P m phl C f d M um R hm d
4 P h r F P *R ur / the S uthern F ld and For t* Ch tl E & C g w ll 1863
5 R b D J H Co fed m d l *Phot graphic H story / the C vil War* N w Y k Th R w f R w C 1911 V l 7 pp 238-96
6 *A Man al / M l tary Surgery* R h m d Ay d W d 1863
7 Ed l *Conf derat Stat M d. and Surg J 2 11* 1865
8 S S. H A ddr rn g h h ry f h m d al h f ld and h p l f th Army d D p m f T *S uthern Pract t oner 24 434-54* 1902
9 H w d E L Eff t f M b ll b *Conf derat Stat M d. and Surg J 1 88* 1864
10 R d J D C ld w dr gs. *b d. 1 91* 1864
11 W l J S R f pp h lf f h h m ru *b d. 1 56* 1864
12 B l J N w m h d f tr u g un un d f ur f th l g bo *bid. 1 55* 1864
13 Murd k R O h ppl f Sm h pl *b d. 1 71* 1864
14 Ar f l l mb –b w t m k h m (Ed l) *b d. 1 59* 1864
15 On h m t f gun h wound by h m lly l g (Ed l) *b d. 1 138* 1864
16 Ch lm J J C f gun h w und d w und m f p dy *b d. 1 138* 1864
17 S S H P l l D H W M g 1882

VICTORY OF NATURE

It falls to the lot of f w men to app ci te properly th eff ct of va s modes of treatment in a p rticular d e e for f a patient eco er what ver was th t tment wh the good or bad we flatte ours l s it was the effe t of our s per o merit nduct ng th dise se b t future pe enc may on ince us that th recove y of wh ch we va ly b aste l w ictory f N tur o e the malpr ctic of art —Edw rd Ke tish *An E say o B rns* 1797

CPC

Clinicopathologic Conference

U S Naval Medical School Bethesda Md
U S Naval Hospital Bethesda Md

HYPERTENSION AND WEIGHT LOSS IN CHILDHOOD

Summary of Clinical History An 8 year old white girl was admitted to the U S Naval Hospital, Charleston S C , on 11 September 1955 with the chief complaint of 14 lb weight loss during the prior 3 months, and paroxysmal spells of headache and sweating She had always been underweight (below the third percentile) and was never very active She tired easily, required food at night, drank a large amount of water, and used salt excessively She always perspired easily Routine examination one year prior to admission revealed proteinuria blood pressure was not taken and no follow up was made

FIRST HOSPITALIZATION

Physical Examination On admission to the U S Naval Hospital, Charleston, S C the child weighed 32 pounds Her pulse rate was 144 per minute and her blood pressure was 196/170 mm Hg (right and left arms) She was poorly developed, poorly nourished markedly cachetic, pale and appeared to be chronically and severely ill She was active and alert Her pupils were moderately dilated and both fundi showed 4 plus papilledema, narrowing of arterioles with spasm flame shaped hemorrhages, and whitish exudate The teeth were carious The heart was slightly enlarged to the left and the apical impulse was forceful

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Capt C I B G Holmes MC, U S Navy Commanding Officer Naval Medical School
Medical Director Lt Comdr R E Dimmette MC, USN Chief

At the time of this conference Rear Adm Edward C Kenney MC USN was in command Officer From the Department of Pediatrics Capt Sidney S Gellis MC USN Chief

A grade I to II systolic apical murmur was heard The remainder of the physical examination was within normal limits

Laboratory Studies The red blood cell count was 3 900 000 per μl hemoglobin 11 grams per 100 ml hematocrit 44 ml per 100 ml sedimentation rate 43 mm per hour (corrected) The white blood cell count was normal The urine was pale showed a specific gravity of 1 004 was negative for sugar and contained 300 mg albumin per 100 ml Blood urea nitrogen was 10 mg per 100 ml Fasting blood sugar was 100 mg per 100 ml Total protein was 8 9 (albumin 4 05 globulin 4 85) grams per 100 ml Chlorides were 550 mg per 100 ml Carbon dioxide was 51 volumes per cent An electrocardiogram showed sinus tachycardia with early left ventricular hypertrophy Roentgenograms of the skull chest and abdomen were normal The basal metabolic rate was plus 31 An intravenous pyelogram showed a questionable downward displacement of the right kidney

Course in Hospital The patient's blood pressure ranged from 200 to 280 systolic and 170 to 230 diastolic Her pulse rate usually remained at 144 per minute On 19 September 1955 without prior antihypertensives or sedatives 3 mg of Regitine (brand of phentolamine hydrochloride) was given intramuscularly with the following results maximum drop in blood pressure in 9 minutes to 130/110 mm Hg from a control of 240/190 blood pressure returned to 230/190 mm Hg in 24 minutes (A positive test is considered a drop of at least 30 systolic/20 diastolic) On 19 September 1955 the patient was transferred to the U S Naval Hospital Bethesda Md

SECOND HOSPITALIZATION

Physical Examination and Laboratory Studies Upon admission to this hospital on 20 September 1955 the physical examination findings were the same as those found during the patient's first hospitalization except that the patient now showed moderate dehydration Her blood pressure was 230/180 mm Hg An intravenous Regitine (brand of phentolamine) test showed a drop in blood pressure to 0/0 in 30 seconds and the patient went into opisthotonos and became unconscious The blood pressure returned to pretest levels in 30 minutes Blood urea nitrogen was 42 mg per 100 ml Total protein was 6 6 (albumin 4 globulin 2 6) grams per 100 ml The white blood cell count was 11 900 per μl with 10 per cent band forms 56 per cent neutrophils 18 per cent lymphocytes and 16 per cent monocytes The red blood cells numbered 2 900 000 per μl and the hemoglobin was 11 grams per 100 ml A roentgenogram of the chest was read as normal except for a rounded 2 5 by 3 cm paravertebral mass in the right side of the chest in the region of the seventh and eighth thoracic vertebrae believed to be a tortuous aorta

Course in Hospital On 22 September the catechol amine levels were reported as 61 μg of norepinephrine per liter of plasma

with no epinephrine demonstrated (Normal values are 1 1 to 5 5 μg for norepinephrine and 0 0 to 1 5 μg for epinephrine per liter of plasma)

On the second day, the patient began to vomit and passed a large, bloody, tarry stool The vomitus was not bloody The red blood cell count was 2 790 000 per μl and the hemoglobin was below 7 5 grams per 100 ml Platelets numbered 32 000 She was given a blood transfusion of 300 ml Later three more tarry stools were passed and a second unit of blood was started Her blood pressure remained around 220/190 mm Hg and her pulse was 140 Late on 22 September hemoglobin was 14 grams per 100 ml and the hematocrit was 44 ml per 100 ml At 190 a dilute Regitine drip was begun (5 mg per 1 000 ml) with the blood pressure stabilizing at 190/160 mm Hg, and the child was taken to the operating room

DISCUSSION

Docto D mmette- Doctor Pearson will you discuss this case?

Doct Pea so This child presented the history and findings of severe progressive malignant hypertension Hypertension is an uncommon finding in pediatric practice but before discussing the differential diagnosis of this sign I should like to emphasize two points First blood pressure varies with the age of the patient Up to age 4 the average blood pressure is 85/60 mm Hg at age 8 it averages 95/62 and at age 12 averages 108/67 Second in determining the blood pressure the sphygmomanometer cuff should cover about two thirds of the extremity being measured Cuffs that are too narrow will give falsely high values

Perhaps the most common cause of transient hypertension in childhood is the functional type seen in excited struggling children Fear and apprehension may raise the systolic blood pressure as much as 40 to 50 mm Hg above the usual level Repetition of the determination and if necessary sedation can establish hypertension of this type

Renal disease is a common cause of juvenile hypertension Acute hemorrhagic glomerulonephritis is a disease which follows beta hemolytic streptococcal infections or occasionally an impetiginous staphylococcal infection Hypertension is seen in 60 to 70 per cent of these cases and may be accompanied by hypertensive encephalopathy The findings of sudden gross hematuria albuminuria periorbital edema and fever in a child with a history of recent sore throat is characteristic of this disease In children prognosis in acute glomerulonephritis is excellent In less than 5 per cent of cases is there a progression into the chronic state Chronic relapsing glomerulonephritis is rare in childhood but is marked by progressively deteriorating renal function along with consistent albuminuria hematuria and Addis counts

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L H w rd A P MC USN R s d nt Ped t r

Pyelonephritis is common in pediatric practice Anomalies in the genitourinary tract are found in about 10 per cent of autopsy cases in children Obstruction secondary to congenital structures valves vessels and malpositions predispose to retrograde infection of the kidneys Chronic destruction of the renal parenchyma may lead to hypertension

Polycystic kidney may manifest themselves at an early age with hypertension and azotemia Urographic demonstration of the so-called dilated pelvis is characteristic

Ischemia of the kidney due to renal arterial obstruction or unilateral renal hypoplasia may produce the Goldblatt phenomenon with liberation of pressor substances from the ischemic kidney and severe hypertension may result

The diagnosis of nephrogenic hypertension usually can be established by careful history and through examination of the urine and appropriate blood chemistry and urographic studies

Another relatively common cause of hypertension in childhood is coarctation of the aorta The findings of an upper extremity hypertension exceeding the blood pressure of the legs by at least 20 mm of mercury is pathognomonic Palpation of the femoral pulsation should be part of every physical examination and any person with hypertension should have the blood pressure in his legs measured

The aforementioned clinical entities account for the vast majority of the cases of hypertension in childhood However hypertension may be seen as part of the clinical pictures in several other diseases It may accompany expanding intracranial lesions both through signs and symptoms of increased intracranial pressure overshadowing the hypertension It is seen more or less regularly in certain dyscrinopathies Cushing's syndrome is occasionally reported in children and is usually accompanied by hypertension A few cases of the adrenogenital syndrome may have associated hypertension Along with the other manifestations of the syndrome this responds dramatically to cortisone therapy These two states have other features such as precocious puberty in childhood or virilism in the female adult which make these diagnoses clear One per cent of cases of hyperthyroidism occur in children and elevated blood pressure is seen in these cases However agitation and exophthalmos generally characterize this disease in children

Moderate hypertension is part of the picture of lead poisoning A history of pica together with constipation anemia stippled red cells suggests the diagnosis Elevated serum and urine lead levels establish the diagnosis

Erythredema polyneuropathy or pink disease due to acute idiosyncrasy to mercury is accompanied by significant hypertension The clinical picture is characteristic—the child is extremely irritable and has an intensely pruritic generalized desquamative eruption of the hands and feet Urine mercury levels are increased

Polyarteritis nodosa may occur during childhood Along with protear signs and symptoms of multiple system and organ involvement an elevated blood pressure may be seen The urine usually contair blood and albumin and azotemia is frequent

Seventy five per cent of cases of hypertension in adults are cla si fied as essential or idiopathic This syndrome is extremely uncommon in childhood It is a diagnosis made by exclusion but authentic ca e have been reported The disease is usually rather rapidly progressive and a fatal termination is the rule

One recently described syndrome deserves particular mention at this point This is familial autonomic dysfunction or the Riley Day syndrome a bizzare congenital defect seen usually in children of Jewish extraction The common features are absent lacrimation drool ing excessive perspiration sharply demarcated episodic kin blotchings in-co ordination and relative insensibility to pain Some of these patients have paroxysmal hypertension and several in stances have been reported in which a patient was erroneously subjected to an exploratory operation for a pheochromocytoma

Lastly we come to what the patient under discussion today probably has i e pheochromocytoma or a functionally active tumor of chromaf fin tissue

This child undoubtedly had a tumor for a long time—at least one year—if her proteinuria and poor development may be considered pertinent If after appropriate chemical and urographic data in a given case there is still a possibility of pheochromocytoma two physiologic approaches might be considered in establishing the diagnosis First, adrenalin antagonists—the so called adrenolytic agents—might be used to cancel out the pressor effects of the circulating catechol amines and cause a drop in blood pressure This is the basis of the Regitine or bezodioxane tests However if there is significant azo temia or if sedative or antihypertensive drugs have been used recently, false positives may be encountered The drop in blood pressure may be very transient Finally as seen in this case a pharmacologic test may have a severe profound hypotensive effect on the patient The second approach in diagnosing a pheochromocytoma is to measure directly the levels of the pressor substances producing the patho physiologic disturbances This would appear to be the ideal method

During the three months before admission to the hospital the pa tient developed malignant hypertension with generalized arteriolar disease secondary to prolonged effect of circulating epinephrine like compounds

In conclusion of this discussion I should like to point out that only if the blood pressure is determined can the many curable types of hypertension in childhood be treated

Dr Pearson s diagnosis

Pheochromocytoma of the adrenal gland

D t D mm tt Is there any discussion from the floor? If ther is no further discussion I should like to continue with this child s course in the hospital Aft r the Regitine drip was est blished and the blood pressure b came stabilized she was taken to the operating room

A subco tal incision was mad from th right anterior axillary line across the abdomen to abo t the left midclav cular li e Preliminary explorati n revealed no gross p lpable abnormality except with ref erence to the superior pole of the right kidney The superior pole of the kidney was covered by a firm rounded tumor m s apparently extending from the sub tance of the right adrenal gland This tumor mass was firmly fixed in position It seemed to extend p st the mid line over the bodies of the spine between the a rta and the vena cava The inferior surface of tl e right adrenal and its contained tumor m ss was freed from the superior pole of the kidney with numerous blo d vessels be ng divided nd ligated With some difficulty the posterior aspect of the gland nd the tumo mass was removed from the right paravertebral fossa where it was adherent densely The tumor ma s was then dissected off the right anterolateral aspect of the aort where again it was densely adherent As this dissection proceeded laterally a very short a terial t unk was of necessity divided close to th aorta When the main blood vessels wer divided there was a sudden drop in blood pressure The small ntest ne w s then care fully inspected and n area about 12 inches in le gth located n the mid ileal are showed marked hemorrh gic d scolorat on Active pe stalsis howev r was s e to pro re cross this egment f small bow l At this p t the patie t s c ndition pp ed crit c l the pulse rate being 190 per min te and th blood p ssure 100/70 mm Hg it was believ d best not to r sect the involved small intest e b c use it prob bly was viable Closure was then m de Dur ng th course f the oper tion Regitin was adm stered intrav nously and discont nued up n removal of the tumor At this p int intraveno s administration of norep n phrine wa begun to maintain bl od pressure

At 0315 on 23 September the patient blood pres ure was stabi l zing at ab ut 160/140 mm Hg and the puls te was 180 per minute At 0930 h r temperature was 104 2 F puls rate 160 per minute and her blood pressure was 160/140 mm H The chest was clear The abdomen was slightly di tended with absent perist lsis The white blood cell count w s 21 450 p µl with 43 per cent band forms 25 per cent neutroph ls 18 per c nt lymphocytes 14 per cent mono cytes and 2 plus toxic granulation The hemoglob n w s 13 5 grams per 100 ml Chlorides were 95 mEq per liter

On the second postoperative day the patient had abdominal pain and upper abdom nal dist ntion and she began to vomit coffee ground m terial Act e peristalsis was heard Her temperature was 99 8 F H r blood pressure w s stable at 160/100 mm Hg

On the second postoperative day she appeared to b improving On the third postoperative day she commenced taking fluids by mouth without diff culty Pe istalsis was active nd urinary output w s good The ur ne wa alkaline spec fic gravity was 1 013 and

PATHOLOGIC FINDINGS

D t H t y At a topsy the body of this 8 year old emaciated white g rl measured 49 inches crown heel and weighed 30½ lb A recent surg cal incision closed with interrupted black s lk sutures extended acro s the hypochrondrium it measured 22 cm in length

The brain weighed 1 160 gram The sulci were narrow and the gyri w re fl ttened The vertebral basilar a d internal carotid arteries as also the circle of Willis were thick walled Meninge pituitary s lla turcica and cranial nerves wer grossly normal

A pale yellow white firm nodule 5 5 cm in diameter was present paravertebrally in th right side of th e thoracic cavity betw en the 7th and 8th thoracic verteb a the ov r ly ng lung was adherent to it The he rt we ghed 140 gram The left ventricle was dil ted and its wall was 3 0 cm n thick ess The r ght ventricul m sculature was 0 4 cm in thickness Circumfer nces of th valves were follows tri cuspid 5 8 cm pulmonary 4 0 cm m tral 4 3 cm and aortic 4 5 cm The po ter r leaf of the mitral val e bore an ather m tous plaque which extended from mid leaf to the free edge The th racic aorta w s thickened mark dly It contained many creamy yellow pl ques throughout its length The right lung weighed 230 g m the l ft 190 gr ms Both lungs e hibited d pende t c gest n purple red blo d ooz d from the cut sect on of the d p dent portions The t acheal br nchial tree p lmon y vessel nd hilar lymph nod s w e without g o s abno mality

The thymus was rudimentary Thyr d parathyro ds and larynx w gros ly norm l

The abdominal surgic l inci ion e h bited no areas of deh scenc A fec l dor w s encountered when the p ritoneum wa ncised F brinous grayish yellow green exud te va present throughout th p itoneal cavity The om ntum was adherent to the small bowel whose loops were dh rent to an ther The liver w gl ed 790 grams The p ritoneal surface was covered w th g yish g n f brinou exudate Th gallbladd r w s normal with the xceptio of p r tonitis and on c mpression of it green sh-black bil flowed th ough the ampulla of Vater The pancre exh bited no gross ab orm l ties The spleen weighed 30 grams It exhib ted peritonitis but no othe gross abno m lity

The esoph gus and stomach wer gros ly n rmal Th muc sa f the duodenum w s bile stained The jejunum w s dil ted The ile m exhibited an area of perforation 0 8 cm n di meter located ap p oximately 5 fe t proximal to the cum From a point 12 cm pr xim l to the perf tion and continu ng to the cecum the wall of the ileum was thicken d and friable with it erosa mottled reddish brown and t mucosa hemorrhagic The adjacent me ent y was th kened a d fr able and mottled dusky r d w th fairly h rp line of demarcat o

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Lt Th m C H y MC USN R d P h l gy

The right and left kidneys weighed 75 grams each A 2 2-cm area of the upper pole of the right kidney was pale and projected lightly above the surface On cut section the pale area extended down into the medulla and was conical in shape Other features of the kidneys ureters and urinary bladder were normal

Internal and external genitalia were normal and consistent with the age of the child The skeletal system and bone marrow were grossly normal

On microscopic examination the myocardial cells were hypertrophied and the coronary arteries had a thick media Many pulmonary alveoli contained edema fluid and some areas of atelectasis were present Foci of lobular pneumonia containing gram positive micrococci were accompanied by small amounts of hemorrhage Some fibrin-filled alveoli were evident

Hepatic cell cytoplasm was heavily vacuolated throughout the liver Arteriolar medial hypertrophy was prominent in the portal areas

Acute fibrinous peritonitis was severe and in some regions was undergoing organization The ileum was gangrenous at its point of rupture in the infarcted area Mucosal and submucosal vessels in this infarcted area were thrombosed some of them were identified as arteries In addition some of the small arteries and arterioles exhibited fibrinoid degeneration of their walls

Those portions of the left adrenal not involved by tumor had a normal configuration Cells of the cortex were relatively nonvacuolated

In the right kidney the area of infarction extended from the capsule into the medulla and was bordered by early granulation tissue A thrombus was attached to the wall and partially occluded the lumen of a medium sized artery in the margin of the infarcted area Other arteries exhibited medial thickening

Periaortic lymph nodes were edematous and the sinusoids contained many macrophages exhibiting phagocytosis

Examination of the blood vessels revealed that the intima of the aorta was thickened by a basophilic myxomatous tissue to an extent

equal in thickness to one half th t of the med a The inner one fifth of the media w infiltrat d by sim l r materi l Ela tic tissue stains (Ve hoeff s) d monstr ted f agmentation of ela tic lamina and f brils n this region Med um and small arteries throughout all s ctions but lun had a media thicker than u ual The pulmonary arteri s were of normal size Thrombos s was ev dent in arteries and veins of the ileum and an artery of the kidney

Brain pitu tary pinal cord thyroid thymus pancr as pelv c org ns a d bone marrow were essent ally neg ti e

The thoracic tumor was attach d to the periostium of the rib but did not penetr te it The left adren l tumor w s surro nded by a thin zone of adrenal cort x from which t wa separated by a thin irregular con ctive tissue (fig 1) Both tumors were composed of cell resem



F g 1 Pheochromocyt ma, hous ng th group g f ell lat t th th n-w all d bl d ls. (× 250)

blin those of the adrenal medulla being pleomorphic with round to o void nuclei which were hyperchrom tic or vesicul r Nucleoli were not prominent The cytoplasm was abundant and eosinophilic with fine granules (fig 2) Much soluble material was absent from the cytoplasm in the paraffin sections Both tumors we e heavily vascular zed and s nuso ds were congested with erythrocytes Large areas of necrosis occupied both tumors together with small amounts of hemorrhage Sections sta ned for the chromaffin reaction (Wissel stain) revealed the presence of fine yellow-brown gran les n the cytoplasm of the

tumor cells (This reaction was not as strong as in the surgical specimen due to post mortem autolysis)

In summary this case is one of bilateral adrenal and intrathoracic paravertebral pheochromocytoma Death is attributed to the complicating cardiovascular disease which resulted in infarction and rupture of the ileum with generalized severe peritonitis Lobular pneumonia

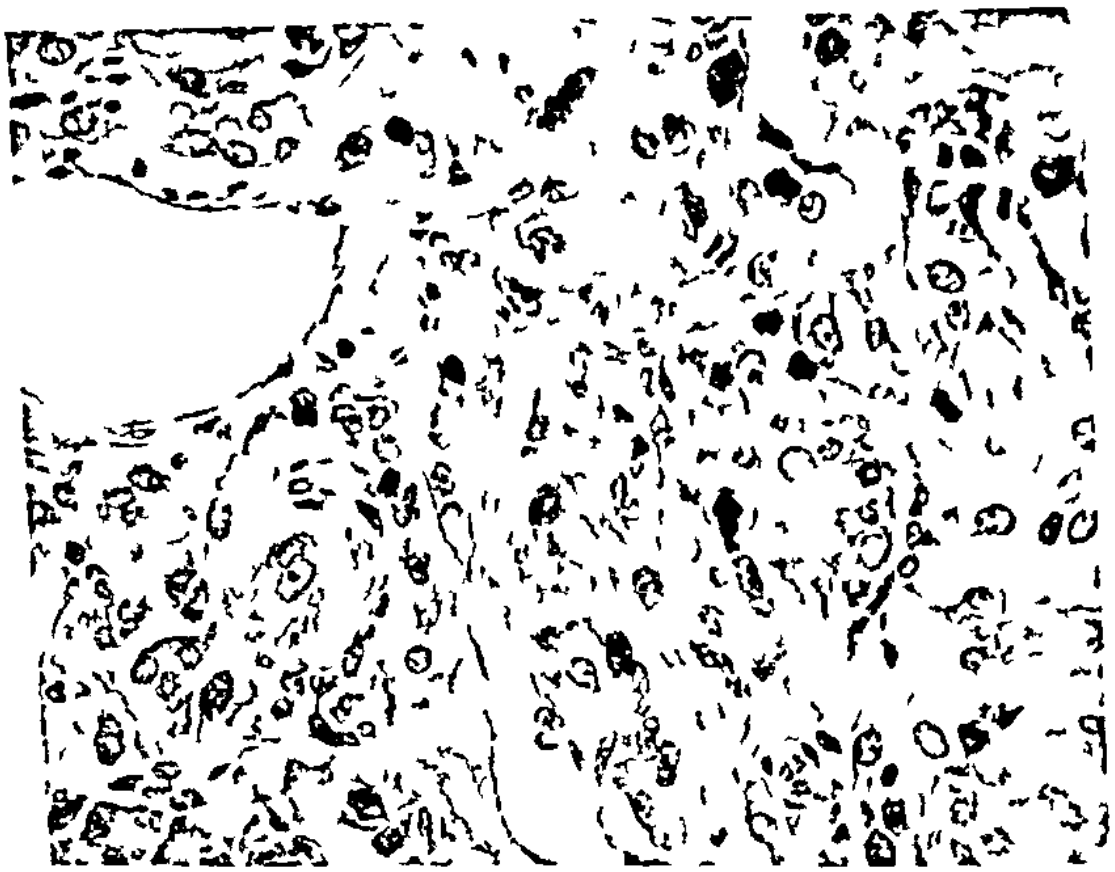


Figure 2. Pheochromocytoma, showing the detail structure of the tumor cells (× 400)

is an additional complication One cannot resist conjecturing about the clinical dilemma which might have presented itself had the bilateral adrenal tumors been successfully removed and the intrathoracic tumor continued to cause symptoms and elevation of catechol amines

Pathologic diagnoses

1 Pheochromocytoma bilateral adrenal and intrathoracic paravertebral sites
2 Hypertensive cardiovascular disease, with thromboses
3 Left ventricular hypertrophy
4 Infarction and rupture of ileum
5 Peritonitis, severe, generalized
6 Infarction, superior pole of right kidney
7 Lobular pneumonia, due to gram positive micrococci
8 Fatty metamorphosis of liver
9 Emaciation

D ct D mm tt Pheochromocytom s are commonly known a *chromaf* fin t ssue tumors of the suprar nal m dulla and by authorities such as Cecil a e not c n ide ed as tumor of ch ldhood The pheochro mocytoma w s d scovered by Eustach us in 1563 and was first des cr bed histologically by Koll ker n 1886

Embryologic lly the rtex and the medulla dev lop as distinct nd separate org ns The first anlage of th medulla is formed by migrat o of the sympathetic primitiv cells al o kn wn as sympathogon a The medulla s compl te in the 85 mm embryo The sympathogon a further differentiate into pheochromobl st and finally into pheochromo cytes which are mature medullary cells These cells are la.ge polygo- n l h ped with fine granular cytoplasm nd round vesicular nuclei U u lly the nucleu is placed in an eccentric po tion w th promin nt nucleoli The reason fo a d t nct type tumor of the cortex nd medulla is on the ba is of th histol ic and clinical dist nct ent ties The m ture pheochromocytes g ve ris to the gr p n which we are p rt c ularly interested—namely the pheochromocytom which is a chromaf fin cell tumor also known as a p aganglıom and has its or gin from the mature pheochromocyte cell

I 1902 Kohn sugge ted that a chrom ff n sy t m consi ted of the so called par gangl on c cell n the carotid gland the bdominal c llection f cells a d the o called o g n of Zuckerk ndl (at the bifurcation of the a rta sp c lly in you g ch ldren) The e c lls *closely re emble cell f the m dull of th adren l only in morph logy* but not in a true hromaff r action The chromaffin ction is characterized by the d posit of br wn granules in the cells when th tissues are fi ed fluids cont ning potassium bichromate Under the influ nce of ep nephrine th potassium bichromate s reduced t insoluble pe ox des of chrom um Kohn lso str ssed the fact th t par g nglıom s have a comm n origin— mbryonic th t is w th the medulla while F lk and MacL od furn hed evide ce that the act ve princ ple of the retroperitone l chrom ff n tissu s ha the sam phy iologic ction as epin phrine M ximow pointed out that the ch maff n tissue cell also ar found in the k d eys li r testes nd heart with questi nable inclus on f the m dull of th s pra renal gl nd This th y was discount d when a nternal secret on wa discovered

From the descriptive literature the first case can be ed ted to Perley in 1890 A detailed description of the tumor wa made by *Man sse in 1893 A rather complete view of the lite ature* w cc mplished by Eisenberg and Wallerstein in 1932 53 cases we repo ted to th t t m In their review the ge range varied f m 2 ½ to 82 y ars with the majority (or 30 per cent) of th tumors occurr ng *n the fifth decade nd 20 per c nt in the fourth decade* In th nalys s th y cl s f d or r ported five m l gn t case Of these th age of th patient w s u known in two and the oth r three oc cu red in p tie ts 30 47 and 68 yea s of ag Of the 48 case n

which the sex of the patient was recorded 25 occurred in women and and 23 in men Of the five malignant cases two occurred in men and one in a woman sex of the other two was unknown

A renewed interest in the diagnosis of pheochromocytoma occurred in the early fifties with the refinements in technics for the isolation and estimation of epinephrine and noradrenalin compounds in the urine in cases of hypertension West and Taylor[10] reported a comparison of the output of catechol amines namely adrenalin and noradrenalin in the urine of patients with hypertension and illustrated how the output in patients with pheochromocytoma is far in excess to that range It is an accepted clinical feature of the disease that paroxysms of hypertension and pheochromocytoma may mimic benign or malignant phases of essential hypertension The system of pharmacological testing introduced in 1945 led to the refinement of the test in present use[10] This consists of injections of histamine mecholyl or tetraethylammonium to provoke a hypertensive crisis The injections of drugs such as benzodioxane or phentolamine commonly known as Regitine antagonize the peripheral action of circulating catechol amines The use of these compounds is not completely reliable and may result in false positive and false negative results

In 1951 von Euler[11] devised a simple screening test for pheochromocytomas which consisted of the injection of 1 ml of untreated urine into anesthetized cats while recording blood pressure readings The rise in blood pressure could be equated with standard noradrenalins Quantities and daily output could be estimated The objections to this test were the volume of urine per concentration and the reactions of a variable type animal

In 1954 Manger and his associates[12] used the plasma levels of catechol amines to diagnose pheochromocytomas At a latter date West and Taylor[1] stated that they preferred the urinary catechol amines as the surest method available for confirming or refuting the clinical diagnosis The normal healthy person excretes between 20 and 40 micrograms of catechol amines per day with a maximum estimated as 60 micrograms The elevation of urinary catechol amines caused by severe muscular exercise results in only a short period of elevation Severe hypertensive crisis also results in a short period of elevation but sustained hypertension usually results with a range of 40 to 60 micrograms with a maximum of 80 micrograms Patients who have active pheochromytomas usually excrete an excess of 100 micrograms a day and the results are usually recorded between 225 and 750 micrograms a day The high rate throughout the day is the best method to estimate daily output rather than a crisis output

The evaluation of a single case as to benignity or malignancy is practically impossible without evidence of metastasis Pheomorphism and capsule invasions or multiple local extra adrenal sites have been suggested as criteria for malignancy Bilateral adrenal or multiple extra adrenal sites where chromaffin system tissue is present is not

believed to be an indication of malignancy due to its frequent f nding n adults at autopsy

Our patient possessed multipl sites of pheochromocytoma rather than a single primary tumor with multiple foci o metastatic tumor

Doctor Cone will you further discuss pheochromocytoma in child hood?

D r C To date we have located 34 reported cases of typically functioning pheochrom cytoma in children less than 14 years of age including 3 children r p rted by us The case presented today is one of these

The average age of onset of signs and symotom was at p *proximat ly nine and one h lf years of age The sex distr bution of* this tumo favored the male ccurring in 25 male and n 11 female p tients These tumors are not limited to the white ace they have b en obs rved in six Negro children Th location of these tumo s *in adult er es fa or the right adre al gl nd but in children pheochro* mocytoma t more likely to be b lateral nd extra adrenal in location In the case rep rted in children the s tes of occurrenc of the tumors were right adrenal 14 cases l ft adrenal 8 both ad en ls 9 extra adrenal 7 These t tal m re th n 36 case because n some of the reported ca es the tumor was mult ple

The organs of Zu kerkandl e much less commonly the site of this tumor than is th drenal medulla To date ncluding one of our *cases there have be n four rep ted instances of a ph* ochromocytoma of these organs The rgans of Zuckerkandl are found in infants nd childre in close r l t on to the aorta the largest being at the origin of the inf rior mesenteric artery Z ckerkandl[1] found that they normally *begin to degenerate early in ext* auterine l fe degenerat on is usually complet by the time the child is six year old It is of interest th t the fetal adren l medulla and organs of Zuckerk ndl contain n r epinephr ne only but in the first few years after birth the amount of no epinephrine in these organs d crease and epinephrine begins to appear

The surg cal removal of thes tumors i n t nece arily d ff cult but the preoperat ve operative and postoper tive control of the pa tient s labile and fluctuating blood pressure may be exceed gly difficult as demonstrated by Hightower Roth and Pr estly[1] The operative mortality in the children in whom surgical emoval of a pheochromocytoma w attempted was 36 per c t Thi figure should *n t be a deterrent to urgical intervention in all cases of pheoch* mocyt m because without operation the progn s s is extremely poor

Although our three cases wer familial in n tur this is not uniq e occur ence W h ve loc ted f ve pr viously recorded insta ce in which a pheochrom cytoma occurred n mo e than one member f a family

In a critical review of reported cases of pheochro ton and Goodall [16] accepted only seven as definitely ma in his excellent review of these tumors stated that c of the approximately 150 cases studied were malign logists agree however that the differentiation of a from a benign pheochromocytoma may be extraordinarily

Most of the children in whom this tumor was discover tent hypertension this is in contradistinction to t where many had a paroxysmal hypertension Although to have a continuous hypertension they can and paroxysmal blood pressure rises on the already exist of hypertension

The clinical manifestations are due to the high leve epinephrine and norepinephrine secreted by the chr the tumors It was previously thought that the hyp result of excessive secretion of only epinephrine h and Goldenberg and coworkers[19] demonstrated that the both epinephrine and norepinephrine It has been c norepinephrine excretion may be as high as 90 per catechol amines present Our cases confirm this obser

Norepinephrine differs from epinephrine pharmacol it exerts a more marked vasopressor effect than epi stricting the blood vessels in the muscles as well a viscera In contrast epinephrine dilates the muscle ar

The tentative normal values for the circulating currently established by the laboratory of Dr Albert National Heart Institute Bethesda Md are nore micrograms per liter of plasma and for epinephrine gram per liter of plasma

Despite the recent development of more precise pl chemical tests to assist the physician in arriving pheochromocytoma a blood pressure determination st to the diagnosis Unfortunately in reviewing the with this tumor in childhood one is amazed at t diagnosis of this tumor was delayed because the sure was not taken as part of the physical examin nation of a child s blood pressure is not difficult sphygmomanometer cuff is used It is advisable to of the procedure to the child and the local sympt cussed and minimized If the initial readings ar the test should be repeated after a short rest peri hypertension a functionally active pheochromocy cluded in the differential diagnosis

REFERENCES

1 C c l R L d K dy F (d t t) *A Text Book* W B S und t C Ph l d lph P 1934 p 1248
2 E tach (1563) C t d f enc 9

3 K ll k (1886) C d f 9
4 K h A. P g m d. Wch h 27 325 1902 Quo d by B l y F R and M ll A M T t Book f Embryol gy 4th d tı W ll m Wood & Comp y New Y k N Y 1921 p 399
5 F lk M E d M L d J J R. E d th t p pl f p l h m ph l h m phy l g l t p pl f p a- l gl d *Am. J Physı l* 40 21 29 M 1916
6 M m w A A T t-B ok f H tol gy W B S d C mpany Ph l d lph P 1930 p 709
7 P l y C d f 9
8 M P Ab t d f m V bow A b f path A at. 133 391 393 1893
9 E b g A A d W ll t H Ph h m cy m f up ar l medull (p g gl m) l p h l g udy *A b Path* 14 818 836 D c. 1932
10 W G B d T yl N R S d ph h m cy m f d l f f hypert d l th dı gn f ph h m yt m *Glasg w M. J* 36 123-129 Ap 1955
11 Eul U S I d ur ary f d l d dren l f ph h m yt m *Arn Surg* 134 929-933 D 1951
12 M g W M Fl k E V B k J B llm J L R h, B M Bl d E J d J b M Ch m l q an ta f p ph d ep ph 13 p w h ph h m yt m C ulat on 10 641 652 N 1954
13 C T E J All M S d P H A Ph h m cy m ch ldr p rt f h f m l l w un l d f m l P dı tn 19 44-56 Jan 1957
14 Z k kandl Cı d f 13
15 H gh w N C. J R h G M d P l y J T Oper and po per l f bl d p ur p w th ph h m yt ma. P d g f th C l S y f Cl l R h 25 h A ual M t ng 7 & 8 N mb 1952 (Ab t N 53) *J L b & Cl n. M d.* 40 810-811 N 1952
16 Sym g T d Good ll A L S ud ph h m cy m p th l g cal p t *Glasgow M. J* 34 75-96 M 1953
17 C h ll G F Ph ch m ytom *J A M. A.* 138 180-186 S pt. 18 1948
18 H l P N d l d l m d llary um urs. *N tur London* 163 217 F b 5 1949
19 G ld b g M F b M Al E. J d Cha g ff E C. E d f ur f p ph d l m d ll *Scı* 109 534-535 M y 27 1949
20 Sı d m A P l mm tı Cı d f 13

NEGATION OF THE ESTHETIC

The pros and cons of d rk glass s are as diverse as are the people who wear them Rel f fr m the excessive dazzle of su light ıs nly the m t obvious motivation Le st compreh n ible perhaps ı the negat n of the esthetic To hide the light of one s eyes beneath a p tr of dark gl sses can scarcely be aught b t tr umatic to the ch rm of on s face Yet p radoxically those who spare no pains and inconvenience n various hat dos and osmetics show no hesitation in cov r ng up that most ttractive of natural features by dark gla ses —Through a Gl s D rkly (editor l) *New England Journal of Medicine* July 31 1958

3 k ll k (1886) C d f 9
4 K h A. P g m d. W h h 27 325 1902 Quo d by B l y F R and M ll A M *T t Book f Embryol gy* 4th d tı W ll m W d & C mp y New Y k N Y 1921 p 399
5 F lk M E d M L d J J R. E d th t p pl f t op l h m ph l s h m phy l g l t t p pl f p a- l gl d *Am. J Physı l* 40 21 29 M 1916
6 M m w A A *T xt B ok f H tol gy* W B S d C mpany Ph l d lph P 1930 p 709
7 P l y- C d f 9
8 M P 4b d f m *V how A h f p th A at* 133 391 393 1893
) E b g A A d W ll s H Ph h m cy m f p ar l m dull (p r g gl m) l p h l g udy *A ch Path* 14 818 836 D 1932
10 W t G B d T yl N R S d ph h m cyt m f d l f f hypert d t l h d g f ph h m y m *Glasgow M. J* 36 123-129 Ap 1955
11 E l U S. I d ur ary t f r d l d dr al f ph h m yt m *Arn Surg* 134 929-933 D 1951
12 M g W M Fl k E V B k J B llm J L R h, B M Bl d E J d J b M Ch m l q an ta f p phr d p ph 13 p t t w h ph h m y m *C culat* 10 641 652 N 1954
13 C T E J All M S d P H A Ph h m cyt m h ldr p rt f h f m l l w un l d f m l *P d tn* 19 44-56 Jan 1957
14 Z k kandl C d f 13
15 H gh w N C. J R h G M. and P l y J T Oper and p per t l f bl d p ur p t w h ph h m yt m P d g f th C l S y f Cl l R h 25 h Annual M g 7 & 8 N mb 1952 (Ab N 53) *J L b & Cl n. M d.* 40 810-811 N 1952
16 Sym g T d Good ll A L S ud ph h m y m p h l g l p t *Glasgow M. J* 34 75-96 M 1953
17 C h ll G F Ph h m ytom *J A M A.* 138 180-186 S p 18 1948
18 H lt P N d l d l m d llary tum ur *N tur London* 163 217 F b 5 1949
19 G ld b g M F b M Al E J d Cha g ff E C. E d f ur f p ph d l m dull *Scien* 109 534-535 M y 27 1949
20 S/ d m A P l *mm tı Cı d f* 13

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to be u ed te-pet..ls u il a pe.. ..e ..e..ure co ld be ..ac Bec u e of the exp..e ..e ..e.., the p ..e.. had ..ecided to use the te..po..a.. p..a..ic ..e..

Loo e fitting d..... ..e u.. Il a p.oble.. for the dentist but al o can be a ratte.. e..io.. pro..le.. fo the otolaryngologist This danger ..as been ..eco..ized, and this tipe of ..emovable prosthesis is no reco..ended e.. for te..po..a.. use [2]

REFERE..CES

1 Le..e.. F L. *Dise..s of the Ear ..ose and Throa.* 6..h e.. ..e.. F .. Da Co Phila ..a Pa 1 2.. - 8) ..e..
2. Holmes H. C. P .. ..e.. ..

SOCIAL DRINKING IN EAST AFRICA

The average East African consumes a tremendous amount of alcohol at a sitting He usually will drink all that is available If he tells you he drinks all he can get " this could mean 20 to 25 large bottles of "European beer" a day whereas the average European rarely drinks more than 2 to 3 at a sitting Moreover the "European beer the African drinks is poor local stuff and has toxic effects that good beer does not have They are fond of spirits of all kinds if they are able to afford them Some of the native drinks are exceedingly potent The usual words used in Kenya for native beer made from grains and it came bananas maize or honey are *pombe* in the interior and *tembo* at the coast *Tembo* is used less frequently as a specific term for beer made from coconut palm sap and *mnazi* is more or less synonymous with it *Mkoma* is beer made from the sap of the branching palm *Lubi* is any distilled drink e g made from the cashew nut and it is very strong Nubian gin is a term given to distilled native liquor is very potent and frequently leads to psychotic behaviour In recent years in Nairobi African juveniles have taken to drinking petrol drained from automobiles—needless to say most of them never got to mental hospital but to the general hospitals or to the morgue!— Edward L. Margetts The Psychiatric Examination of Native African Patients *Medical Proceedings Medicae Bydraes* October 4 1958

SUMMARY

Two cases of pilonidal sinus of the umbilicus are reported Pilonidal sinuses may occur wherever skin surfaces are in contact particularly if there is frequent motion and there is abundant growth of hair Treatment consists primarily of removal of hair

REFERENCES

1 B l y R P l d l us w th y f g *B u J Surg* 43 62-68 J ly 1955
2 D w g J G B b p l d l *J A M. A* 148 1501 Ap 26 1952
3 Ew g M R H ır be g us (L tt h Ed t ct) *Lanc t* 1 427 M 29 1947
4 M th A D I t d g l p l d l us ed by w L *Austr l & New Z land J Surg* 21 76-77 Aug 1951
5 P t y D H dS ff R W P l d l us b b h d w h b rv t p t l p l d l *Lancet* 2 13 14 J ly 3 1948
6 W ma M d Ol t R G P l d l f h d *A M. A Arch Dermat & Syph* 66 466-469 O 1952
7 Aird L P l d l f ll *B u M. J* 1 902 903 Ap 26 1952
8 R dd g M D S m lt us t d p p l d l y t *Am. J Surg* 92 666-667 N 1956
9 Sm th T F An p l p l d l cy *J A M. A.* 136 973-975 Ap 10 1953
10 H d w y R M P l d l y t— h p l d l y t *A. M A Arch Surg* 76 143 147 J 1958
11 Kl A. A S ll d p l d l *C nad M A J* 75 737 742 N 1 1956
12 H d w y R M P l d l y m m d m d t d d m tr t d *U S Armed For M. J* 7 516-522 Ap 1956

UNFINISHED BUSINESS IN SCIENCE

I have no quarrel w th th explor tion of outer space It is a legitimate and chall ng ng subject for scientific in quiry and bold experiment Our opt cal and mathematical studies of it have long since giv n us that basic confide ce in order without which there could be no science But as we extend our astronomy by whatever celest al acrobatics we can get away with I should like to see some consider- ation given to relative values We have a vast amount of unfinished business at our feet The golden moment for the pickpocket comes when every ne at the county fair is cran ing his neck t the b lloon ascens on S far as the skies are concerned we are feeling the n tur l soreness that comes from losi g a sporting event we thought was in the bag Actually if my information is correct the Russians had explained that they intended to launch a satellite had indicated its probable size and h ve promised to sh re the knowledge o gained —Paul B Sears The Inexorable Problem of Space *S nc* Janu ry 3 1958

examination revealed definite cleral icterus and a slightly enlarged and rather tender liver Because of a presumptive diagnosis of infectious mononucleosis and the abdominal tenderness palpation of the abdomen was done cautiously and only by the senior author The spleen was not felt Within five to ten minutes after this examination the patient complained of severe left upper abdominal pain with radiation to the left shoulder Re examination revealed marked tenderness and guarding especially over the left upper quadrant A diagnosis of ruptured splee was made

The blood pressure fell to shock levels and the hemoglobin fell from 12 6 to 10 0 g am per 100 ml Plasma (3 units) and then whole blood transfusions (10 units) were given As soon as the blood pressure was stabilized an mergency plenectomy was performed

At operation a very large soft extremely friable spleen was found There was a large anterior l cerat on 4 000-5 000 ml of free blood was *found in the abdominal cavity*

Microscopic examination of the spleen revealed some destruction of the follicular pattern There was mononuclear cell nfiltrat on in the trabecula and sinusoids Many of these cells were atypical

Post perative course was complicated by the development of thrombophlebitis at the site of the venipuncture but was otherwise uneventful

Laboratory studies pending at the time of surgical intervention revealed a positive cephalin cholesterol flocculation a prothrombin time of 100 per cent and heterophil antibody agglutination positive in 1 3584 dilution

DISCUSSION

It is well recognized that the soft spleen usually seen in infectious mononucleosis may be difficult to palpate even though markedly enlarged Although the incidence of palpable spleen in *infectious mononucleosis varies from 33 per cent to 72 per cent* the incidence of splenic enlargement is not known Custer and Smith found that the spleen was invariably enlarged during the height of the disease as shown by the weights in the protocol of eight autopsies In three of these cases death was not associated with splenic enlargement or rupture Custer and Smith recommended that when infectious mononucleosis is suspected enlargement of the spleen be taken for granted palpation be omitted and the diagnosis established by the more certain means available The spleen in our patient as in three others reported in the literature was so soft as to be nonpalpable The extremely mild trauma of a cautious physical examination is certainly no more than a patient would be subjected to in normal daily activity It was our belief that had this patient not been hospitalized he might well have suffered a so called spontaneous splenic rupture Had this calamity occurred far from a medical facility the outcome might have been quite different

The question which is raised by this case and other similar cases in the literature is that of hospitalization of patients with infectious mononucleosis Certainly it is not feasible or practical to hospitalize all patients with the disease, but the potential danger of "spontaneous" splenic rupture does exist The patient with the "nonpalpable" spleen is not immune to this danger

SUMMARY

A case of splenic rupture in infectious mononucleosis following abdominal examination is presented Thirty one other cases of splenic rupture in infectious mononucleosis have appeared in the literature These were reviewed and only one case was found in which abdominal palpation seemed to be of causal significance The question of hospitalization in infectious mononucleosis because of the danger of splenic rupture is raised

REFERE CES

I L b w t S *I fect us Mononucl osis* Mod r medical monogr hs 5 Cr n & Str tto I c N w Y k N Y 1953 pp 38-41

2 D is J M d H nah L G Spontane us r ptur of pl e d to i f ct ons mo l o i r p t of c s *New Z aland M. J* 55 491 492 Dec 1956

3 Sm th E B d C t r R P R ptur f pleen nf ct s mo n cle i cl n cop th l g c r port of 7 c *Blood* 1 317 333 J ly 194(

4 L wr c J S Inf t us mono ucl In C cil P L nd I o b R F (editor) *Textbook of M dicm* 9th d ti W B S nd rs Company Phil delphi P 1955 pp 84-88

5 Pr ss J H Shl n E L a d R A P I f cti us m nucl o is st dy f 96 cas s *Ann Int M d* 22 546-562 Apr 1945

6 Cust r R P and Sm th E B P thol gy of inf cti u m ucl *Bl o I* 3 830 857 Aug 1948

7 Vaughan S L R g n J S d Te pl K I f cti us m ucle i compli- c t d by spontan s r ptur of spl d cent I rvous y t m i olv me t *Blood* 1 334 338 J ly 1946

8 M lv lle H J Sp tan s pture f spl complic t ng i f ctio mono- n l os s *M J Aust al a* 1 356-388 M r 5 1955

9 H gl nd R J nd H H M Sple c t ptur in infectio s mon nucl osi *Am. J t. Med.* 46 1184 1191 J 1957

10 M r n B Cull n P L ng R C Bo g t jury" rupture f sple n in in f cti us m ucle sis *Ca* i *J* 73 213-214 A g I 1955

11 Turdor R W R p — plee n nf ti m on cl o s *Brit M. J* 2 813 814 Oct 10 1953

12 Timmes J J A nd M tc lfe J Splen c pture in nf ct m cl si *New Englar* 173 175 July 29 1948

NAVY N NURSING COURSE

Twelve Navy and tw nurses completed a four month course in nuclear nur U S Naval Medical School Bethesda Md on 19 l ducted under the direction of Captain E Richard King f the Department of Nuclear Medicine The curriculum tion in the principles of radioisotope therapy and p care of mass casualties as they relate to the diagno ursing care of patients

GEN CATHROE USAF DENTAL CHIEF TWO COMMAND SURGEONS PROMOTED

Major General James S Cathroe who was appointed chief of th U S Air Force Dental Service in February 1958 recently received his second star and Brigadier Gener ls James G Moore and Rich rd L Bohannon USAF (MC) have been promoted from the rank of colonel Simult neously with these promotion M jor General Oliver K Niess the Surgeon General of the Air Force was dvanced to the permanent rank of major general



G Cathr



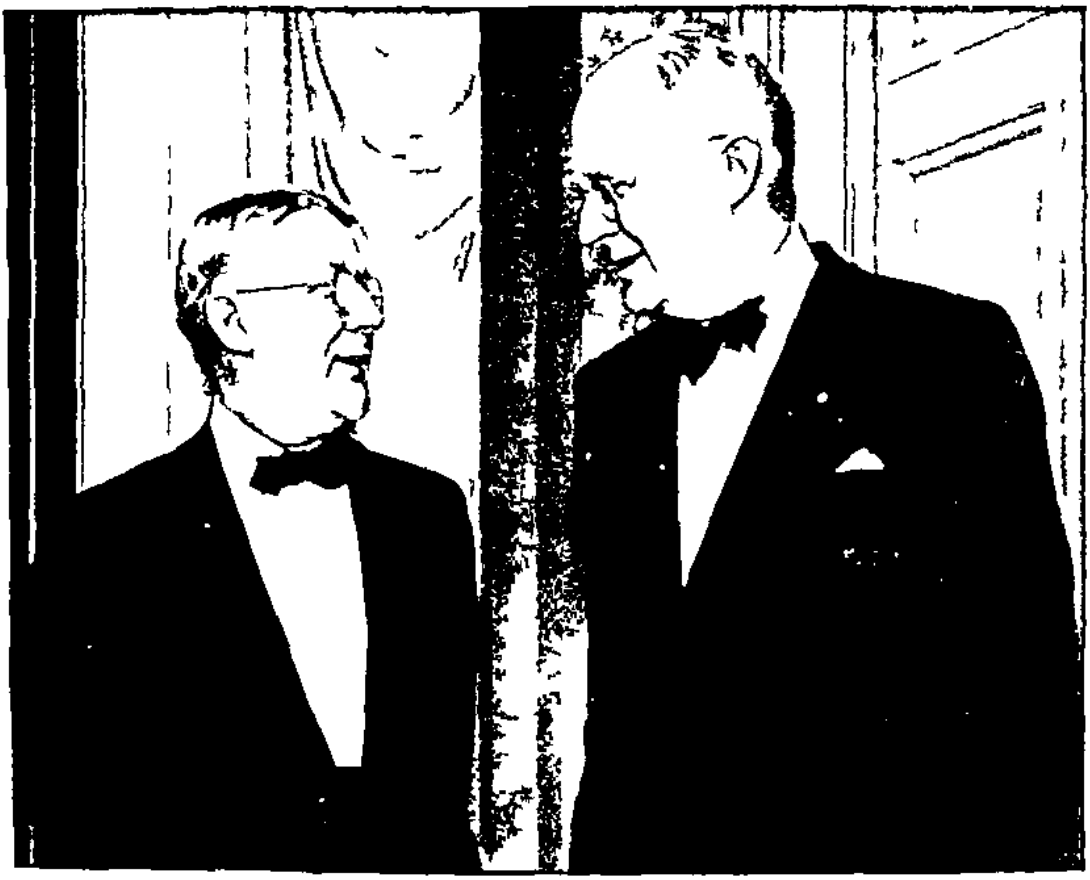
Gen M



G B ba o

General Cathroe a gr duate of Creighton Un versity College of Dentistry entered the service in 1928 He has serv d as st ff de tal surgeon of Eastern Flying Training Command the Car bb n A Com mand and the A r Training Command

Gen r l Moore and Bohannon both re native Tex ns and received their degrees of doctor of medicin in 1932 Both hold the r t ng of chief flight surgeon and h ve been certified as specialists in a i tion *medic ne by the American Board of Preventive Medicine Before be ng* nam d surgeon on the Air Training Command in August 1957 General Moore was comm nder of the Air Force s largest hospital at L ckl nd Air Force Base Texas Previ u ly he served as surgeon of the West n Air Defense Fo ce H milton A r F rce Base California nd of the Pacific Division of the Mil tary Air Transport Service in H wai Ge e al Boh nnon fo merly surgeon of the Fifteenth Air Force March *Air Force Base Californ a was n med to a sim lar position t the* Fifth Air Force in J pan in the spring of 1958 He has held p ev ous signments in the Second Air Force and the First Tactic l A r Com mand in Germany



HONORED AT SYMPOSIA Dr John B Youmans left technical director of research of the new Army Medical Research and Development Command was honored last month by symposia on nutrition in internal medicine and on medical education held at Vanderbilt University School of Medicine where he was formerly dean He is shown with Dr Frank B Berry Assistant Secretary of Defense (Health and Medical) who served as chairman of the symposium on nutrition

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PORTRAIT OF GEN OGLE UNVEILED

A portrait of Major General Dan C Ogle USAF (MC) the third Surgeon General of the Air Force who retired on 30 November 1958 was unveiled recently in ceremonies at the Officers Club Bolling Air Force Base in Washington It is permanently displayed in the Office of the Surgeon General together with those of General Ogle s two predecessors Major Generals Malcolm C Grow and Harry G Armstrong The painting is the work of Gardner Cox of Boston one of two living artists with portraits in the National Gallery of Art in Washington It was accepted as a gift of the Air Force Medical Service by a committee composed of Major General Olin F McIlnay Deputy Surgeon General Brigadier General John K Cullen and Colonel George B Green USAF (MC)

AVIATION PATHOLOGY COMMITTEE ELECTS NAVAL CAPTAINS WILBUR AND BALLENGER

Captains Carl E Wilbur nd Murray W Ballenger MC USN were elected chairman and secretary e pect vely of the Joint Committee on Aviation Pathology at a bus ness meeti g of the group held at the Armed Forces Institute of P thology on 11 December They succeed Colonel Frank M Townsend USAF (MC) Deputy D rector of AFIP chairman for the past two years and Dr F K Mostofi who has served as secretary since establishment of the committee by Department of Defense direct ve in 1955



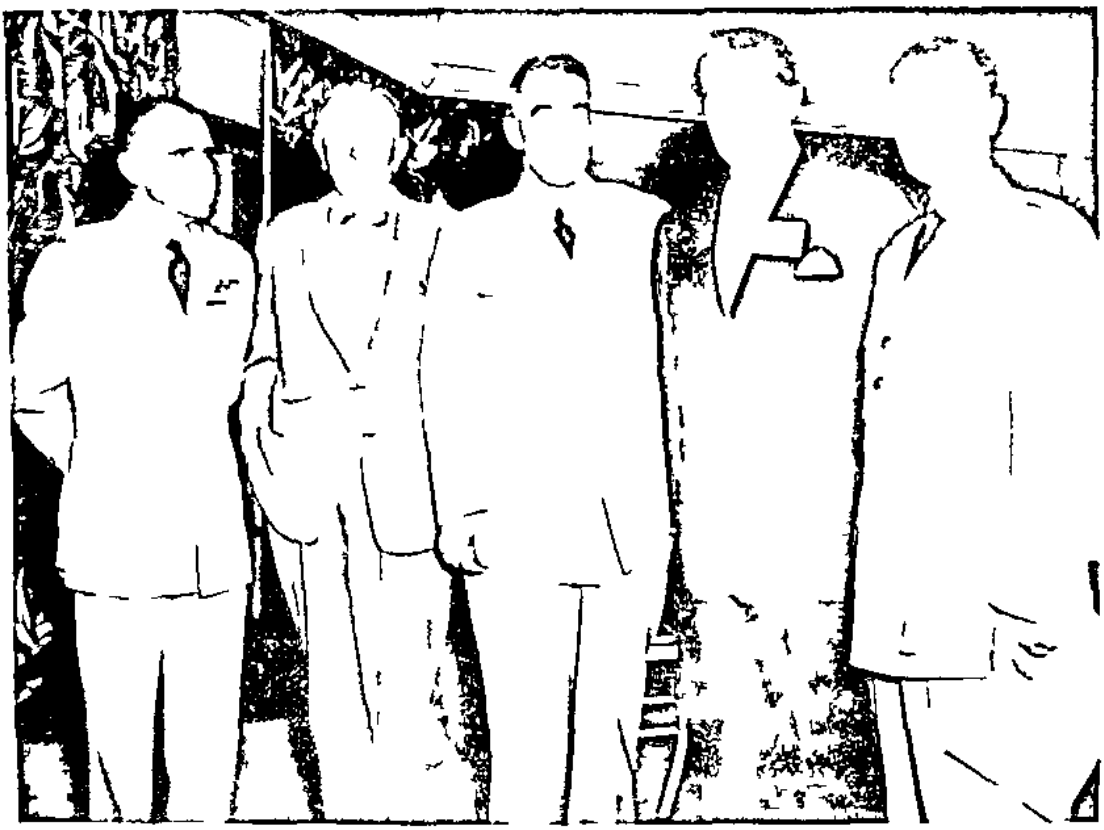
Capta W lb



Capt Balleng

Under the chairmanship f Colonel Town end the committee held its annual cientific essi n from 29 S ptemb r to 2 October 1958 at the Royal Air Force Institute of Pathology d Tropical Medicine near London More th n 100 scienti ts nterested in avi tion pathology attended this first meeting of th ommittee outside the United States Speakers ncluded Air Comm dore J S Wilson Director of Hygiene and Research Royal Air Force and Ai Comm dore W K Stewart Director Gener l of the RAF Institut of Aviat on Medicine Panel discussions were led by Air Commodo e W P Stamm and Group Captain E Bruce Harvey RAF and Drs W R Fr nks and How rd T Karsner

The object ves of the c mmitt e are t nitiate det iled pathologic ex minat on of aircraft accidents evalu te any possible human caus ative role n unexpl i d acide ts obse ve recurring traum tic lesions which may be pre ent ble nve tigate the po sible insidious changes induced by repeated nd l ng expo ure to flight conditions and es tablish a long ang pr g m of collection of such information and disseminate t to the member services



SPACE MEDICINE SYMPOSIUM Shown here from left to right are some of the leading participants in the Second International Symposium on the Physics and Medicine of the Atmosphere and Space held in San Antonio Texas 10 11 and 12 November under the sponsorship of the U S Air Force School of Aviation Medicine Lieutenant General Walter E Todd USAF commander Air University Dr Hubertus Strughold advisor for research and professor of space medicine at the school Major General Oliver K Niess Surgeon General of the Air Force Dr Wernher Von Braun technical director Army Ballistic Missile Agency and Major General Otis O Benson Jr USAF commandant of the school More than 600 space scientists from all parts of the world attended the symposium

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ADMIRAL HOGAN RECEIVES PERUVIAN MEDAL

Rear Admiral Bartholomew W Hogan Surgeon General of the Navy recently was awarded the *Cruz Peruana el Merito Naval en el grado de Gran Official Distintivo Blanco* (The Peruvian Cross of Merit) by the President of the Republic of Peru The decoration was presented to Admiral Hogan by Rear Admiral Luis Edgardo Llosa Naval Attache at the Embassy of Peru in Washington D C in connection with the celebration of Peruvian Navy Day The award was given in recognition of the assistance that the Medical Department of the Navy has given to the Peruvian Naval Medical Service

FIVE RESERVE NAVAL MEDICAL OFFICERS PROMOTED TO RANK OF REAR ADMIRAL

Five distinguished phy icians who served in the Navy during World War II ecently were promoted to the rank of rear admiral in the Med c l Corps U S Naval Reserve The new flag off cers are Joseph S Ba r Newton Center M ss Fr ncis J Braceland Hartford Conn William L Rogers San Francisco Calif Robe t A Ross Chapel Hill N C and Wendell G Scott St Louis Mo

Dr B rr clinical professor of orthopedic surgery at Harvard M dical School served on active duty from December 1941 until March 1946 Duri g the first two y rs of the war he organized and developed aud o visual ed cational aids that were of great value du ng the r pid war time expansion

A speci list in neuropsychiatry Dr Braceland was on active d ty from J nua y 1942 to June 1946 Under hi guidance th neuro psychiatry program of the Bureau of Medicine and Surgery w s ex panded into a leading component of the Medical Department H is psy hiatri t in ch ef of the Inst tute of Living and clinical professor of psychi try Yale Un versity School of Medicine

Dr Roge s who s clin cal profes r of surgery at Stanf rd Uni ver ity School of Med cine served f r three ye rs during World War II in va ous advance base hospitals n the P cific theater and later was chief of the surg cal service t the U S Naval Hospital Cor na Calif

An ob tetrician who won the Purple Heart Dr Ross saw action in early 1944 in the Ph lippines and at Okin wa Subsequently he was chief of obstetrics t the U S Naval Hospital Charlesto S C He i p ofessor of obstetrics and gynecology at the University of North Carolina School f Medicine

Dr Scott the wartime chief of radi logy at the U S Naval Hospitals in San Diego Calif and Seattle Wash rece ved a commend t on from the Chief Bureau of Medicine and Surgery for his outsta ding service in diagnostic nd therapeutic radiology He is now profes or of radiology at Washington University School of Medicine



Adm B c l d



Adm. Ro



Adm. R ger



Adm Sc tt







MILITARY NEUROSURGEONS Here are the officers of the Society of Military Neurosurgeons which will hold its fourth annual meeting at the U S Naval Base New Orleans on 30 April 1959 in conjunction with that of the Harvey Cushing Society From left to right Colonel Wistar L Graham USAF (MC) U S Air Force Hospital Maxwell Air Force Base president Lieutenant Colonel George J Hayes MC USA vice president and Captain Frank B Clare MC USN U S Naval Hospital Portsmouth Virginia secretary

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RESERVE COUNCIL MEETS Shown above is the Advisory Council to the Army Surgeon General on reserve affairs which met recently in Washington to discuss the activities of the Army Medical Service reserve program Seated left to right are Major General Silas B Hays The Surgeon General Brigadier General Perrin H Long and Major General James P Cooney The Deputy Surgeon General Standing are Colonel James H Kidder Special Assistant to the Surgeon General for Reserve Forces and Brigadier Generals Alexander Marble, Harold G Scheie Frank E Wilson Manfred U Prescott Harold C Lueth Truman G Blocker Jr Carl S Junkermann Thomas P Fox Joseph M Bosworth and James B Mason



NEW FLAG OFFICER R r Admir l Thomas F Cooper MC USN left Command g Officer of th N ti nal Nav l Med cal Center B th d Md present R r Admi al Calvin B G llow y MC USN with h s appo ntment to hi present ank in ceremoni h ld o 1 Dec mber The new fl g off ce h s been sign d to th Bure u of Medicine and Surg ry s Ass stant Chief for Re ea ch and M litary Med c l Sp ci alt es Pr or to hi pr moti n he had b en Comm ndi g Off ce of the U S Naval Medical Scho l and is forme he d of th U S Nav l M dic l R rch Unit in Cairo Egypt

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AIR FORCE CLINICAL SURGEONS MEETING

Surgical Complications is the theme of the forthcomi g annu l meeting of the S ciety of Air Force Clinical Surg on at Wright Pat terson Air Forc B e Ohio 11 13 May 1959 according to anno nce ment by Colonel Don S W nger USAF (MC) president of th gr p Air Force Medical Corp officers who are int rested in joining th society should write to the secretary Major Nichola M Azz to USAF (MC) L ckl nd Air Force Base Te

A MESSAGE FROM THE A M A

The Bureau of Health Education of the American Medical Association which is concerned among other things with the health and safety of school children has prepared the following suggestions regarding disaster protection at school

The school is one of the largest assemblages of people in the community It includes members of a significant proportion of the families comprising the community Inasmuch as children are in school a good part of each day there is a fair probability that any disaster be it enemy action or fire flood storm, or explosion, may occur during school hours The need for coordination of the school disaster plan with the civilian defense program is obvious

Learning is easier and what is learned is remembered longer when it can be interpreted in terms of the learner s experience Much of the failure of John Q Citizen and his children to learn the routine procedures for civilian defense can be attributed in part to the idea that "it can t happen here " because enemy action is foreign to their home experience On the other hand there is ample evidence of the success with which communities and their schools have prevented many casualties from storm fire, and explosion and have efficiently cared for the injured From the solution of problems caused by these "natural" disasters to the handling of casualties and the evacuation of large groups exposed to the disaster of warfare is a step that is within the understanding of most people It would seem then that every effort should be made to help schools make plans for the protection of pupils from the more common mass hazards in such a way that these plans would be equally applicable to disasters of less common occurrence

This subject was discussed by a group of physicians educators and public health personnel at the American Medical Association s Fifth National Conference on Physicians and Schools It was the concensus of this group that civilian disaster planning for school populations must be fluid and in accord with local civilian defense and disaster planning for the total population In disasters which strike suddenly the alternatives are to "duck and cover" or to concentrate students at the core of the building Where warning provides a reasonable time for preparation there may be either a planned evacuation conducted by school officials with mass transportation to a predesignated reception center or release of pupils to homes for evacuation of families A combination of these is possible depending on such factors as the occupation and location of parents age of children availability of transportation and other local factors

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From the Council on National Defense of the American Medical Association This was prepared at the request of the Department of Defense —*Editor*

Family integrity should be preserved wherever possible but inasmuch as this may not be possible a plan utilizing school facilities and personnel should be available This must involve suitable delegation of authority and responsibility to each adult in the school so that in a crisis everything works as smoothly as a modern fire drill

Obviously it is not possible in a few words to suggest how every type of school should plan for every type of disaster However with local conditions in mind most schools should consider at least these significant items

1 *Communications* How to communicate and with whom must be preplanned Persons responsible for communication and their alternates must be designated and authorized in advance Communication must be established with agencies responsible for group safety as well as with parents to allay parental anxiety

2 *Evacuation* Tornadoes hurricanes earthquakes floods fires and explosions—as well as the threat of enemy action—may require evacuation of the school building Drills should be carried out to establish routes and the duties of rescue teams monitors safety patrols teachers engineers bus drivers and others

3 *Immunization* Basic immunization should be maintained especially against tetanus Children should know the condition against which they have been protected drugs to which they are allergic and chemicals to which they are sensitive

4 *Identification* Children should be identified as recommended by the local civilian defense authority which may be related to existing school health record systems

5 *First aid* Supplies for first aid should be maintained at the maximum potential level and provision made to transport them during evacuation Teaching and supervisory personnel engineers and bus drivers should be trained in the practical use of first aid supplies and psychologic support

6 *Other supplies* In isolating disasters such as a flood or blizzard food and bedding will be needed at school School lunch supplies maintained at maximum will be adequate in most instances Cots blankets and other disaster supplies belonging to civilian defense organizations or the Red Cross can be stored in the school and thereby be readily available to both the school and the community

7 *Termination of school disaster jurisdiction* Children should be returned to their own family unit at the earliest possible moment or if the family a casualty to the official agency responsible

The welfare of our children demands constant vigilance against disaster A planned program of action to meet all eventualities is the better part of such vigilance Community plans must include the schools—and school plans must recognize community relations In planning to meet disaster all groups and individuals who may be involved should be consulted and where practical included in the formulation development and implementation of the plan

CORRESPONDENCE

SURGICAL TREATMENT IN NECROBIOSIS LIPOIDICA DIABETICORUM

To the Editor I read the interesting report of a case of necrobiosis lipoidica diabeticorum by Captain Virgil H Voss USAF (MC) on pages 1654 1658 of the *U S Armed Forces Medical Journal* for November 1958 For the sake of completeness I wish to call attention to two important references overlooked by the author which emphasize the possibility of treatment of this condition by surgery The first is a paper by E P Cawley and R O Dingman in *A M A Archives of Dermatology and Syphilology* 63 764 767 June 1951 The second of more recent vintage is by J W Kelley in *Plastic & Reconstructive Surgery* 22 342 347 October 1958 In the cases reported in these two papers treatment consisted of radical excision and skin grafting

ROBERT H IVY M D Editor
Plastic & Reconstruct ve Su gery
Paoli Pa

HEMORRHAGE OR INFARCT?

To the Editor —I read the article on pages 1364 1369 in the September 1958 issue of the *Journal* by Colonel Arthur J Levens and Captain Frank W Kiel entitled Wallenberg s Syndrome Resulting from Hemorrhage with great interest This condition is indeed one with which all clinicians should make themselves familiar since all too often the average physician is perplexed when confronted by this syndrome and assumes that the patient must have a brain tumor I would like to take exception however to the main thesis of the paper that the patient suffered his illness due to a hemorrhage Actually the cerebrospinal fluid examination performed on the day of onset revealed no cells and none were found until the fifth day after the onset when only 2 600 red cells per cubic milliliter were found along with xanthochromic fluid The photographs in the article would indicate to me that the patient had actually suffered a hemorrhagic infarct in the medulla rather than an actual hemorrhage such as was implied by the title

EDWARD J SULLIVAN M D
Jacksonville Flo ida

Dr Sullivan s letter was referred to Colonel Levens and Captain Kiel who made the following comment

From a clinical standpoint the authors favor the diagnosi of hem rhage rather than infarct because of the following 1) The re youthfulness of the patient would appear to be again t episodes 2) A history of hypertension was presen and t associated with hemorrhage [1] 3) Blood does not nece in the subarachnoid space in hemorrhage[2] nor in infa admixture of blood in the cerebrospinal fluid m

hemorrhage o infarction 4) There was no ev dence to support a emb lic p ocess

From the p th logic v ewpoint the authors favo the diagnosi of hemo rh ge b cause of the followi g 1) Thrombos w s not evident in the p stero nferior c rebellar a teries 2) No app rent areas of thr m- bot c d mage 3) There was a sh rp demarcation between hemorrhage in the med ll and the adj cent uninvolved tissues 4) The wa gain no patholog c bas s for embol In ega d to the ta dy pp arance of blood n th cereb l spinal fluid the authors beli ve n view of the bove that this i mer ly an interesting feature of the case and in itself a gues ne ther fo nor ag i st hemor hage or nfa ction Ev dence cl nical o pathologic fo arteriosclerosis ither cerebral or els where w minimal or absent Oth xpe ience would be ap preci ted

REFERENCES

1 B k A. B (d) *Cl ic l N ur logy* P l B H b l c. 1955 p 488
2 W l S. A K *N ur logy* 2d d Ed d by N A. B W ll m & W lk Co 1955 V l 3 pp 1378-1379
3 Cr H R y B ll J P P H d F g I O l f b l art ry I l d p h l g udy f 14 p d *N urology* 8 145-152 F b 1958

BOUQUET FOR NOVEMBER JOURNAL

To th Ed t I just read the l d rticle in the November 1958 *U S Arm d Fo ces Med al Journal* o the ma gem nt of ac te appendic tis by Colonel Bower and a soci tes d Dr Cunningh m s article o The Conf derate Med cal Serv ce I bel eve this s on of the best i sues of the *Journal* yet publi hed The ppendiciti articl should be e d by ll jun r med cal office s a d senio a d men It was p thet c to find the probl ms f th Confede te medic l off cer still with us o m ny inst nc

THOMAS H LANE Lt C l MC USA
S g on XVIII A b m C p
F rt B gg N C

REHABILITATION CONGRESS IN MEXICO CITY

Dr Fra k B B rry Ass stant Secretary of Defense (H alth and Medical) Rear Admir l Bartholomew W Hogan Surgeon Gen r l of the Navy and Captain Reginald Rambo MC USN of the Bureau of Medi cine and Surgery ttended the Second Nat on l Cong ess on Rehabil tation of the D sabled in Mexico C ty in November Org nized by th Mexican R h b l tat o Associ tion and sponsored by the 13th National As embly of S ge ns Mex co the Congress erves to p omote re habilit tion for the Republ c of Mexico and to make stud es of var ous programs of reh bil t t on

OFFICERS CERTIFIED BY SPECIALTY BOARDS

The Surgeons General of the military departments have announced that the following regular Medical Corps officers have been certified by the specialty boards indicated

American Board of Dermatology

J hn on W ne C. Ca t USA
McF dden Arch b ld W Ca t USA
Norma Clyd W Capt USN
V.ley W ll m R Maj USA

American Board of Pathology

Clinical Pathology

Irey Nel S Lt. Col USA

American Board of Ophthalmology

S han Raymo . A. J Lt. Col USA
St en R ger C. USN

American Board of Otolaryngology

H nn H r H C t. USA

American Board of Surgery

Boa d of Thoracic Surgery

W nn Dea F M j USA

American Board of Anesthesiology

Co D na D Ca t. USA

American Board of Pro thodontics

Lundqui t D ld O Ca t USA

DEATHS

BLOCHBERGER I ne Ca ol e L utenant Colon l ANC USA of Leav n worth Kans tat oned at Fitz mon Army Ho pital Den Colo graduated in 1932 f om St John H spital School of Nur ing Leavenworth commissioned a second lieutenant in the Un ted State Army 'S Augu t 193' died 7 Nov mb r 1958 g d 47 at F tzs mon Army Hospital of multiple my l ma

GOULD Robert Barry Fir t L ut nant ANC USAR of Vancouve Wash tat oned at 28th G ne al Hospital F ance graduated in 1954 from St Joseph Hospital School of Nur ing Tacoma W sh erved in an enlisted tatu from 15 Nov mber 1955 to 25 Ap il 1956 commiss oned a econd l eutenant n the Un ted Stat Army R s rve 13 March 1956 ord red to activ duty 2 Ap l 1956 died 14 Novembe 1958 aged 26 in Fran e f om injur eived in an automob le accident

SHALLMAN Morton Lieutenant Colonel DC USAR, of Chicago Ill stationed at U S A my Ho p tal Fort Hood Tex gradu ted in 1940 from Loyola Un versity School of Dentistry Ch cago Ill served in an enl sted status f om 26 D cembe 1936 until 15 May 1938 commissioned a first lieutenant n the Un ted Stat Army Res rve 7 September 1940 ordered to active duty 2 Ja uary 1941 died 29 Octobe 1958 aged 44 at U S Army Hos pital Fort Hood of coronary occlus on

Reviews of Recent Books

MEDICINE AND THE NAVY 1200 1900 by J J K I D S O R N V l m II 1649-1714 332 p g ll str d E & S L g t L d Ed burgh and L d P bl he 1958 Di t b t d by Th W ll am & W lk C mpany B l m Md 1958 P $8 50

In thi second volume of his h story of the Medical Department of the Roy l N vy the uth r covers one of the most mpo t nt peri ds in Brit h naval annals th times f Cromwell and the later Stuart sovereigns Both were p rt al to the navy and in ti t d many d ministrative ch nges a d reforms in the care of the s ck and wounded and th st tus of naval surgeons I terest the ea service is hown by the noble pre mble to the Nav l Regulatio issued by Charles II whe it states It is upon the N vy und r the go d Prov dence of God th t the s fety honour and w lfare of th s Realm do chiefly depe d James II served t se in the D tch wars of th 17th century a d hi daughter Mary was r pons ble for turning a form r p lace into th first nav l hospital of modern times the nav l hosp tal at Greenw ch for the use of the Royal Navy

One fund ment l adm ni trat ve chang made during the period from 1649 to 1714 w the e t blishme t f the offic of surg on gene l or Chirurgeon G ner ll a it was then written James Pear e as um d the office on 30 March 1675 For the first t m th navy had some c ntr l di ect o of med al care by a medical man Other impro e m nts were ta da d list of medical st es for hips of diff rent rates higher st ndards of p ofess onal train ng fo naval urg on bett equipment of hospit l hips and high p y nd more ecognition of med cal p rsonnel The uthor gives many thumbnail sketch s of men who were leade s n na al med c ne at that time One was W lliam Cockburn whose book *"Th A count of the D stempe s of S afaring P opl* was long a stand rd work James Yonge H gh Ryder and John Moyle wer othe wh showed th t n all ages th e are out st nding medical men the equal of th se today in skill r ource and d vot on to patient

Dr K ev l had plann d a monumental naval m dic l history of the British navy to f ll pe h ps four o mor volumes His unt mely death in 1957 s all the mote to be regretted because he w s so well fitted f r the task not only as a medical historian w th a real l terary gift but s a former m dical officer of the Royal N vy with experience in peace and wa he h d an intimate knowl dge f the work and prob lems of the naval surgeon He had received the D S O for devotion to duty in the a r attack on the *Illustri us* in 1941 Like the f rst volume th s one is handsom ly bound in blue and gold and with f ne paper and typog aphy The e is n extensive bibliography and a most useful chronology of naval and naval medical history during the period covered by the narrative —*LOUIS H RODDIS C pt. MC USN (Ret.)*

RADIATION PROTECTION by *Carl B Braestrup* and *Harold O Wyckoff* Contributors *Merrill Eisenbud Titus C Evans* and *S Allan Lough* 361 pages illustrated Charles C Thomas Publisher Springfield Ill 1958 Price $10 50

This book is written to present currently available knowledge and technical data on radiation protection to a large number of people who are working with radiation sources but are not themselves experts in radiation protection The authors have accumulated a large body of useful data much of which has been determined experimentally and a minimum amount of theory Much of the data here presented is available in other places notably the *Radiation Protection Hand book* published by the National Bureau of Standards but the organization of material presented in this volume and the simple explanatory way in which the text is written make it much more valuable than the sources from which it draws The authors draw from their own experiences wherever possible to illustrate points or make common sense" recommendations This is evident in the sections on measurement of radiation and hazard control The presentation of biological effects of radiation nonsealed radioactive sources and atmospheric contamination blend well with the rest of the book The appendix contains distance protection data particle ranges and attenuation data for x and gamma ray beams in various materials The book is well worth the price to one interested in gaining a single useful source of radiation protection data although the more advanced worker will probably find nothing here that is not already available in other publications —*THOMAS G MITCHELL Lt MSC USN*

AN ATLAS OF ESOPHAGEAL MOTILITY in Health and Disease by *Charles F Code* M D Ph D *Brian C eame* M D M R C P *Jerry F Schlegel* B S *Arthur M Olsen* M D M S in Medicine *F Edmund Donoghue* M D M S in Medicine and *Howard A Andersen* M D M S in Medicine 134 page illustrated Charles C Thomas Publisher Springfield Ill 1958 Price $8 50

This small attractive atlas summarizes a good deal of information about the gullet's muscular activity If the reader does not expect it to be more than the atlas it intends to be he will find here a clear and pleasing presentation of esophageal pressure patterns in health and in achalasia and scleroderma It is a summary of seven years of experience in recording such pressures The material is dealt with in a completely noncritical fashion and the pressure tracings pre sented are single typical examples of each phase of the various sub jects encompassed There is very brief but notably lucid explanation of the patterns shown we became convinced that the (tracings) tell the story themselves The pressure graphs and halftones have been prepared with emphasis on clarity and simplicity, in the spirit of a walk through display and as published they appear large pleasant and luxurious The authors obtained the recordings through use of a miniature swallowed, electromagnetic pressure transducer Intraluminal esophageal pressure changes move a tiny iron plunger within the coils of a differential transformer all within a 3 by 9 mm capsule at the end of an esophageal tube For simultaneous recordings from different esophageal levels multiple open tip tubes connected to

extracorporeal transducers were used The electrical output is carried to large complicated looking amplifier galvanometer d c rding c mera Respiratory activity and th ele tr cal potenti ls of the volun t ry ph se of swallowing are recorded synchronously The th racic surgeon and gastro nterologist should know the things that this book has to teach They will not be able to find elsewhere the inf rmat on so completely and clearly summar zed

—EDDY D PALMER Li C L MC USA

CIBA FOUNDATION COLLOQUIA ON ENDOCRINOLOGY V l m XII H m P d tt E d T m Ed t f r he C b F d t *G E W W l t h lm* O B E M A M B B Ch d M O C B A 287 p g w h 58 ll str t d umu l t d t V l m I XII L tl Br w & C mp y B M 1958 P $9

This twelfth volume of the Ciba Fo ndation Coll qui on E docr ology pres nts the papers and di c ss ons of a lim ted tt nd nce me ting held in Lo don from Ju e 24 to 26 1957 Each paper se ved to summ rize the work of th author i a p rticul r area and as a start ng point for the ub eq ent discu sion Mo t of the pre entat ons were conc rned with th prod ct n biochemistry physiology and mai tena ce of hormon p oducing tumors n exp rimental animals Tho e r lat d to hum n c ncer and of v lue to physic ns were the ubjects of odinat d compounds n th s rum of patients w th thy oid c ncer the e cretion of gonadotrophin in patients w th hydat dif m mole or chor onepitheliom a d the eff ct of hypophys ctomy

This book i of c n id rable v lue to inv stigators in thi field s nce it brings together in ne volume a summary of mu h ur nt form t n Particularly helpful is the inclus on f the di cuss on Wh le there s ome info m tion of clin cal sign f c nce regarding the appl c b lity of v r ous hormone ass ys in the diff re tial d ag nosis of hormone p oduc g tumors this volume is of l mited value to th pr ctic g phys ci n A cumulat ve index includi g the p esent and the leven preced g volumes s included

—NATHANIEL I BERLIN Li Cd MC USNR

DISEASES OF THE LIVER AND BILIARY SYSTEM by *Sh l Sh l k* M D F R C P M R C P 2d d t on 719 p g ll t d Charl C Th m P bli h r Spr gf ld Ill 1958 Pr $11 50

A medical t xtb ok mu t achi ve popul rity to wa rant a econd editio only three years after the first publication Dr Sherlock s treatise was publ shed in March 1955 reprinted i Octob r 1956 a d published in Sp nish in 1956 The econd ed tion issued in May 1958 is requir d to repo t additions to our knowledge and to recast previous m terial to a cord with thes fresh views Th author has retained the or gin l form t description of the functional and morpho logical changes which may occu in the li er and the clinic l and laboratory methods used to study them Afterward individu l d sease entities re descr bed Clin cal d agnosis and treatment re g ven prominent place th ughout the bo k The n w book contain four

pages less than the first edition many references have been deleted and replaced by 500 new ones mostly recent ones The newer knowledge of bile pigment metabolism of drug induced jaundice of the chemical changes which accompany hepatic coma are suitably integrated into the appropriate places in the text and illustrations The entire volume appears to have been thoroughly rewritten and considerably improved Dr Sherlock s own extensive experience is reflected throughout the book and it gives a quality of confident assurance to the writing This book will be useful to all physicians who must treat patients with liver disease

—BENJAMIN H SULLIVAN Jr Col MC USA

SOCIAL PSYCHIATRY IN ACTION A Therapeutic Community by *Harry A Wilmer* M D Ph D Captain MC USNR Foreword by *Francis J Braceland* M D Preface by Rear Admiral *Bartholomew W Hogan* MC USN 373 pages illustrated Charles C Thomas Publisher Springfield Ill 1958 Price $8 5

This book is a report of an experiment in milieu and social psychiatric therapy in the closed ward of the U S Naval Hospital Oakland California the West Coast psychiatric treatment center The study is well documented and gives the reader the authentic atmosphere and "the feel of a closed ward in a graphic use of the patients own language That "the care of the patient is a matter of caring for the patient" is subtly but clearly pointed out The influence of the environment i e the attitudes of the entire therapeutic team and the value of planned and analyzed group therapy sessions is graphically explained as a new method of ward management and therapy The author is careful not to project his conclusions on to other situations contenting himself with fully describing what happened in the daily community meetings on the ward and the staff conferences of the ward personnel which followed immediately Aside from the psychiatrist none of the ward personnel was specially trained for this approach but under the impetus of Dr Wilmer s enthusiasm and dedication they became motivated There was further help from his artful use of psychoanalytic insight into personality structure and his acute powers of observation All aspects and problems of the program used on the ward during this period including what was done or not done about medications seclusion rooms and suicidal threats are reported as they happened The only embellishments are the author s clear prose descriptions

The volume contains two extensive bibliographies listed as primary and secondary with subgroups under the primary (key articles) giving reference to the major literature on both milieu and group psychotherapy There are many charts indicating the varied diagnoses backgrounds and ages of the many patients There is a foreword by Dr F J Braceland and a preface by Rear Admiral B W Hogan Surgeon General of the Navy The book has much to offer anyone working in this field and should be in the library of every military medical establishment that has a closed ward —*FELIX H OCKO Capt MC USN*

extracorporeal t ansducers we e u ed The electrical output is carried to a large complicated looking amplifier g lvanometer and recording camera Respiratory activity and the electrical potent al of the vol n tary phas s of swallowi g are rec rded synchronously The thor cic surgeon and gastroenterologist should know the things th t this book has to teach They will not be able to find elsewhere the information so complet ly and clea ly summ r zed

—*EDDY D PALMER Li C L MC USA*

CIBA FOUNDATION COLLOQUIA ON ENDOCRINOLOGY V l m XII H m n P odu End n T m u Ed t f th C b F d on *G E W W l t h lm* O B E M A M B B Ch d M *e O C* B A 287 p *g* w th 58 ill t at n d um l t v i d t V l m I-XII L l B w & Comp y B t M 1958 P c $9

Th s twelfth volume of the Ciba Foundation Colloquia o Endocrin ology presents the pap rs a d di cu ns of a limit d attendance m eting held in London f om June 24 to 26 1957 E ch p per s rv d to summarize the wo k of the author in a particular area and as a st rting po nt for the sub q ent discussion Mo t of the presentations w e concern d w th the p oduct on bioch mistry phy ology and m inten nce of h m n p ducing tumors experimental an m l Th s el ted to hum n ncer a d of value to phys cians were the subject of iodinat d c mpound n the se um of p tients with thyroid c nce the excretion of gonadotr phin in patients w th hydatidiform mole or ch r onep thelioma and th effects of hypophysectomy

Th s bo k s of conside ble value to in est g tors in th s field since it b ings together in one olume summary f much current nform t n P rticularly helpful is the inclus on of th d scuss on Wh le there is some inform t on of clin cal significance regarding the applic bility of v rious hormone a says in th diffe ent al diag nosis of horm ne produc ng tumors this volume i f l mited value to th p ct c ng physici n A cumul t ve ndex including the pr ent and the le en preceding volumes is included

—*NATHANIEL I BERLIN Li Cd MC USNR*

DISEASES OF THE LIVER AND BILIARY SYSTEM by Sh la Sh l k M D F R C P M R C P 2d d t 719 p g ll t d Charl C Th m P bl h Sp *ngf ld* Ill 1958 P $11 50

A med cal textbook mu t achieve popularity to warrant a second ed tion only three years after the fir t public tion Dr Sh lock s treatise wa publ shed in March 1955 reprinted in October 1956 a d publ shed in Spani h in 1956 The second edition issued n M y 1958 s requir d to report addit ons to our knowledge and to recast previous material to a cord with these fresh views The utho ha retained the or ginal form t a description of the functional and morpho log cal changes which may occur in the liver and the cl nical d laboratory methods used to study th m Afterwa d indiv du l dise se entities are described Clin cal diagnosis and treatment are g n a prom nent pla e th ughout the book The new book contai four

A color photograph of all the commercial forms of antiepileptic drugs introduces the book In short well illustrated chapters epilepsy is adequately discussed The disorder is defined its causes elaborated subtypes described and modes of therapy outlined and rationalized Relationships of heredity and epilepsy receive logical common sense treatment In few words the authors point out how the electroencephalogram can best be used Principal electrographic differences between cerebral dysrhythmic types are clarified but not exaggerated

The section on medication is of great value Each useful antiepileptic drug is briefly but carefully discussed and its indications and possible side effects are mentioned A table of differential diagnosis and management is a useful addition and a fairly extensive bibliography is included This book should be read by any physician who ever treats an epileptic patient While it is somewhat oversimplified a rational idea of epilepsy is presented in highly readable form It is warmly recommended as a valuable addition to any medical library

—*HENRY W HOGAN Maj MC USA*

PRINCIPLES OF RADIOGRAPHIC EXPOSURE AND PROCESSING by *Arthur W Fuchs* 2d edition 284 pages illustrated Charles C Thomas Publisher Springfield Ill 1958 Price $10 50

The material in this book was developed to train U S Army x ray technicians at an accelerated rate during World War II The original version of this text is currently contained in two Army training *manuals* X ray Film Processing and "Principles of Radiographic Exposure The author attempts to give a complete course in x ray technic in 26 short chapters and he succeeds quite admirably The first few chapters are devoted to the theory and history of x rays radiographic terms and x ray film The author discusses image characteristics radiographic exposure and body tissues and the important functions of focus film distance kilovoltage and milliampere seconds In this portion of the book he discusses theory experiment and application in relation to each of the above factors The remainder of the first part of the book is devoted to standardization of exposure and the development of exposure tables The second part of the book is devoted to x ray film processing and stresses that correct processing is an important function in radiography because uniformity in result is dependent not only upon the exposure technic employed but also upon the care with which the film is processed The material is simplified and readable and should assist any radiologist or technician in the production of better radiographs

—*JOHN L. HATCH Capt MC USN*

THE WAKING BRAIN by H W *Magoun* Ph D 137 pages illustrated Charles C Thomas Publisher Springfield Ill 1958 Price $4 75

This volume presents the role of the reticular system in wakefulness and behavior and includes discussions of the reticulospinal influences and postural regulation reticular influences upon central afferent transmission reticulohypothalmic influences and neuroendocrine

regul tion eticulodiencephalic and rhinenc ph lic systems and emotion reticulocortical i fluence for w kefulness and attention nonspecific br in m cha isms and neuroph rm cology and etic lar nfluence and cortical activity The utho has utilized th publi cat on of oth rs extens vely in compiling this inf rm tive book but he himself has contribut d generously to the nvesti ations n th s field He lists 197 refer ce and his name is included in 20 of th e To present the info mat on succinctly the l ngu g of the neuro phy iologi ts is used For nyo e w th an intere t however rem te in th anatomy and physiology of the central nerv us system it is well w rth th time nd labor to what ver degree needed to become acquainted o reacq ainted w th the scientific a mamentar m and termi ology of the n urophy iol gists and to xplore the c ncepts reported he e Th gre test usefulness of this bo k for the neuro physiol gist i the collection of data in th one volume and the x *ten iv bibli graphy Mo t of the m t ri l has been published in* cient fic journals and i the b und v lum s of the tr nsact ons of the confer nces on n rve impulse sponsored by the Jo iah M cy J Foundation The printi g and binding are supe b and the text is amplified l ber lly with cl ar and well coded f gu es

—*WILMOT F PIERCE C pt MC USN*

BLOOD GROUPS IN MAN by *R R R* Ph D M R C S F R S d *R th S g* Ph D B S w th f w d by P f S *R Id F h* F R S 3d ed t on 377 p b Ch l C Th m P bl h Sp gf ld Ill 1958 P $8 50

The th rd editi of this standard fer nce w k a welcome add tion t a y libr y at a time wh n so m ny new f cts are be g discov ed S nce the last edition i 1954 our knowl dge of the Rh facto and the s called m r syst m has incre sed trem ndously The authors have handled the materi l in a masterly fashio pl cing empha is the p oper pl ce and p inting t the are of practic l application as opposed to those of strictly c demic nterest Th s is ne of tho e rare vol mes w th a cl ty of style th t will be p prec ated by both the general phys cian and re rche Although the titl of th book impl es a d scussi of all meth ds of bl od group ng the book is lim ted to the tradit nal c n epts dealing lmost ent ely with th ntig ns of the red cells D scu s ns of the vario s *hem glob n h proglob ns and white cell nt gen are omitt d*

—*BRUCE H SMITH C pt MC USN*

DENTISTRY FOR CHILDREN by *J h C B* D D S A B M S F A C D *W ll m W D m tt* D D S *L. B H gl y* B A. D D S M S F A C D *R y L. L d hl* D D S M S *M ry M l* D D S M S nd *I S h* Ph D D S 4th d 492 p g ll t d M G w H ll B k C mp y I N w Y k N Y 1958 P $11

The contr b tors of thi new diti n h e reta ned the purp se f produc g volum for students of dentistry n the und rgraduat d gr duate levels Chapters re arranged a d group d into two sections on fundament l c nsiderations nd technical p ocedur s Many new

diagrams and illustrations have been added and the text has been brought up to date Dental as well as medical practitioners interested in pediatrics will find a large part of this book applicable to every day practice Problems relating to the development of the teeth preventive orthodontics dental caries and its control lesions and infections of the oral tissues nutrition and the endocrine glands warrant the interest and attention of both It includes the latest findings in pulp and root canal therapy cavity preparation various restorative materials denture service and construction treatment and restoration of traumatized central incisors and new uses for space maintainers This reviewer believes that this edition will be accepted widely by the profession particularly because of the six authors significant past contributions to the advancement of the study of dentistry for children as clinicians teachers and authors They have attempted to present material that will help develop a philosophy and operational procedure commensurate with present day knowledge

—*ROBERT N BEST Maj USAF (DC)*

CLINICAL ENDOCRINOLOGY by *Karl E Paschkis* M D *Abraham E Rakoff* M D and *Abraham Cantarow* M D 2d edition 941 pages illustrated Paul B Hoeber Inc New York N Y 1958 Price $18

Endocrinology has become such a complex specialty in the past five or ten years that it is now virtually inconceivable that one individual could write an authoritative and comprehensive text Consequently most recent works have been a result of collaboration occasionally with resultant areas of contradiction overlap and omission The present volume suffers from none of these defects and is a welcome addition to other more familiar standbys in this field The endocrine glands are considered individually in the conventional manner with discussions of embryology gross and microscopic anatomy and pathology physiology and diagnosis and treatment Particular emphasis is placed on basic science and the pathologic physiology of clinical abnormalities is lucidly presented

There are however a number of errors with respect to the clinical aspects of certain endocrinopathies that will require further editing In the discussion of thyroid disease the authors state that no case of myxedema coma treated with intravenous triiodothyronine has yet been reported although this has been documented as early as 1957 in *Lancet* The statement that the thyroid responds with increased radioiodine uptake to the thyroid stimulating hormone in acute thyroiditis is misleading and inaccurate and needs to be modified in the light of more recent studies than the one quoted In the discussion of Cushing s syndrome no mention is made of either rib or pelvic fractures that some investigators believe to be an even more consistent finding than osteoporosis Many endocrinologists might take exception to the authors suggestion that 10 to 20 mg of desoxycorticosterone acetate in oil be administered routinely in the treatment of Addisonian crisis This reviewer personally feels that such a pro

be h rmful in view of the untreated Addisonian s known sen itivity to this materi l the concom tant administrat on of salt and the pr blem of irregula and d lay d absorption from ntramuscul r depot sites in protr cted hypot nsion Prop r ttention is not accorded the newer *synthetic ste oid der vat ves in the tre tm nt of chr nic* adrenal in suff ciency and in general the d scussion of the u e of t roids in nonendocrine states is d ficient

The histor cal approach is preserved and refe ences are f the most part compl te and up to date In the discussion of hypoglycem however no reference i made to Whipple s triad and the most out standing review on the subject is not includ d in the bibliography alth ugh it appea ed in the *American Journal of M d c ne* in 1955 The 200 pages devoted t th endocr nology of th ovary and the placenta are superb and far surpas cover g of the ubject n any availabl t xt The chapter on labor tory methods and commercially *available hormone preparat ons re other distingu sh ng features* Thi volume w ll be of con d rable valu to th student and p ct t oner but its great t usefulness may pos ibly be to the gynecologist and obstetrician who r physiolog cally o ient d or the internist w th a particular interest n thes speci lt es

—*PAUL J ROSCH Capt MC USA*

A SYNOPSIS OF SURGICAL ANATOMY by *Al d L* M G *gor* M Ch F R C S w h f w rd by S *Har ld J St l* k B E F R C S 8 h d t on 808 p g 766 llustr by D *E A Th ma* Th W ll ams & W lk ns C mpany B lt m Md 1957 P $7

The avowed purpose f the uthor is to pres nt pr ct cal anatomy to the surgeon in training and to the tudent s a supplement to clas ical textbooks Thi volume is in two p rts the an tomy of the norm l nd of the abnorm l In this new edition the section on adrenalectomy njuries to the lymph ducts and parag ngliom are new and other section have b en revi ed The ch pt rs in each part are separate ess ys dealing with a gion organ or system Although the anatomic d ta are well pres nted and clearly illustrat d th s book has some er ous defects The organizat on is somewhat diffi cult to follow and the index mu t be used extensively t find all the *references to a particular subject e g the hand is di cussed n* eight *different chapter* The clinical application are not dequate Some have been clearly outmod d s aberrant thy id nd oth rs have been much modif d Only about 10 p r c nt of the efe enc s to the literature are later than 1940 The section on adren lectomy lthough new in this edition mentions only hypertension a a in dication The sect ons on the supporting tissues a e well done Al though thi book i adm ttedly intended only as ynopsis and supple ment it is diff cult to use as a reference and much of the clinical work is outdated In a field with m ny c mp tito s this book suffers by comparison —*PHILIP D CRONEMILLER Capt. MC USN*

SURGERY AND SURGICAL NURSING by *Edward S Stafford* B A M D F A C S and *Doris Diller* B A M A R N 3d edition 709 pages illustrated with 174 figures W B Saunders Company Philadelphia Pa 1958 Price $5

The third edition of this book is a well organized and well written text complete in every detail and illustrated by well chosen photographs and drawings Each chapter has cross references interspersed throughout followed by an excellent bibliography The early chapters deal with the fundamentals of surgery and surgical nursing Next the various subdivisions of surgery are considered Special surgical nursing procedures are discussed in their proper places, thus eliminating unnecessary repetition The reviewer recommends this book to residents in surgery as well as surgical nurses

—FERDINAND V BERLEY Capt MC USN

DISINFECTANTS Their Values and Uses by *W E Finch* with a foreword by *H Berry* B Sc F P S F R I C 188 pages illustrated The Macmillan Company New York N Y 1958 Price $5 50

The control of strains of resistant organisms has become so important that this book is a timely publication With the ever increasing urgency of developing methods to prevent cross infection in hospital wards this work should be of great interest not only to researchers in the field and manufacturers of disinfectants but also to clinicians and surgeons The author begins his book with a brief history of the practice of disinfection and devotes some time in the second chapter to formulation methods with particular regard to the principles involved The next chapters are devoted to the phenolic disinfectants, active quaternary ammonium compounds and the hypochlorites The remainder of the book brings out the practical application of the use of the knowledge gained in the previous chapters *i e* the best materials and methods used to obtain maximum germicidal results in hospitals including disinfection of instruments materials linens furniture, buildings and the skin of the patient A final chapter deals with manufacture and standardization of disinfectants and a glossary of words and phrases in common use is added This is a readable and informative treatise and should be of special value to laboratory workers, researchers and those concerned with disinfection in hospitals

—CLARK P JEFFERS Capt MC USN

BASIC CARDIOLOGY by T E Gumpert M B Ch B F R C P 169 pages illustrated The William and Wilkins Co Baltimore Md 1958 Price $6

This concise presentation of basic cardiology consists, for the most part of lectures given by the author in medical school and to postgraduate students It is not intended to take the place of a standard textbook of cardiology but was published to bridge the gap that exists between the detailed descriptions by the specialist and the accounts to be found in the standard textbooks of internal medicine All major aspects of heart disease are described in a clear accurate, brief and concise manner The therapeutic measures are adequately discussed and are current The illustrations utilized are well selected and roentgenograms of the various types of heart diseases are particularly well chosen to assist the reader in understanding the m

present d Many cardiac dis ders are illustr t d gr phically by the elect card ograms and these add cl rity to the presentatio The format of the book i excellent a d logical and th t xt is well edited Despite it brevity th s volume presents a concise accurate and qu te complete syn ps s of the subject of basic c rdiology that should be ben ficial to med cal students general pr ctit oners and to other practic ng physici s.—*RALPH D ROSS C pt MC USN*

MODERN TRENDS IN ANESTHESIA d t d by *F k T E* M B B S
F F A R C S D A d *T C I G y* 22 t b t 331 p *g*
ll t t d P ul B H b I M d l B k D p tm f H rp &
B th N w Y k N Y 1958 P $15

The editors of thi book have endeavo ed to collect all r c nt knowl edg of a esthesia i some 300 p ges Of the 22 c ntr buto s 18 r English one is Swedi h one Can dian and two re Americ n All are recognized investigators n the respective f elds The mate ial is well organized nd summarizes the curre t k owledg of pharma cology nd physiology s it affects nesthes a The pharm cology and mode of action of the newer drugs the rel a t and the phena threne group are covered br efly The ewer meth ds used s adjuncts in urgery such as hypothermia hypotension nd extracorporeal circulat on are d scussed The compl cat ons a d the pathology ssoci ated with anesthesi are p esented o cisely Thi is not a book for beginn r the scope of the mate i l covered m k t difficult reading It is an excellent book for the teacher who must prepare lectur s fo resid nt The ext sive bibliography is one of the m st v luable features of the book —*DANIEL M. PINO C pt MC USN*

A TEXT BOOK OF X RAY DIAGNOSIS by B t h A h in F V l m
V lume III Ed d by *S C h Sh k* C B E. M. D F R C. P
F F R d *P t A l y* C V O C. B E M. D F R C P
F F R D M R E 3d d t 883 p g 802 ll t W B
S und C mp y Ph l d lph P 1958 P $23

Th s third volume that deals w th the abdomen exhibits all the fine qu lities of the earlier edition namely succ nct style of w iti g without verbosity cl rity of ts m ny illustr ti ns and detail d de scriptions of the num rous items of roentgenologic interest This part cular volume cov s the al ment ry tract i clud ng s li a y gla ds the b l ary tract the ur nary tract the remaining abdominal viscer and th roentgen aspects of ob t tr cs and gyn cology Amo g the evisio s are mor deta led descriptions of esoph g tis and peptic lcerat on of the esoph gus renal arteriogr phy and the ph rmacology of certain r diograph c contrast med a notably ch lo r fi and hypaqu sod um A number of n w illust at ons h ve been dded The ch pte s on th pathologic biliary tract nd the radiology of the pl c nta are largely rewritten a d there re m nor r visions in the chapter n pel v metry Altho gh the book fulfills th hopes of the editors in refl cting the b t current pr ctices of di g ostic roentgenology th reviewer do n t share th feel ng th t the improvement over the second edit on are of such gr at import n e number *d magnitude as to* requir the publ catio f a new exp nsive edit n

—*HARRY L. BERMAN C L MC USA*

PEDIATRIC CLINICS OF NORTH AMERICA Volume 5 Number 3 Symposium on Behavior Disorders *Harry Bakwin* M D Consulting Editor Published quarterly 834 pages W B Saunders Company Philadelphia Pa 1958 Subscription price $15 per year

This issue of *Pediatric Clinics* consists of 16 articles written by various authors in the field The subjects deal with such practical problems as office management of everyday problems drug therapy eating difficulties obesity sleep disturbances school phobia mental retardation the brain damaged child the psychological aspects of asthma constipation masturbation and problems of the adolescent as well as possibly the more serious problems of schizophrenia autism and juvenile delinquency Another clinic on the entirely unrelated subject of neonatal candidiasis consisting of 14 pages is also included The authoritative position of the authors is recognized and each does a remarkably good job of introducing the subject under discussion As is true with symposia in general however the lack of completeness should be mentioned For example only 13 pages is devoted to the large subject of Problems of the Adolescent These deficiencies may be considered to be adequately covered by a large number of references following each article Special mention should be made of the excellence of The Management of Mental Retardation Behavioral Syndrome Associated with Brain Damage and Office Management of Everyday Problems Every physician who reads this symposium particularly the ones interested in the care of the child as a whole will realize his obligations to the child enjoy a greater understanding of behavior problems in general and possibly be better equipped for management of them when indicated

—*ODGEN C BRUTON Col MC USA*

LIGAMENT AND TENDON RELAXATION (SKELETAL DISABILITY) TREATED BY PROLOTHERAPY (FIBRO-OSSEOUS PROLIFERATION) with Special Reference to Occipito-Cervical and Low Back Disability—Trigger Point Pain Referred Pain Headache and Sciatica by *George Stuart Hackett* M D F A C S 3d edition 151 pages illustrated Charles C Thomas Publisher Springfield Ill 1958 Price $6 75

This is a somewhat lengthy dissertation on the author's use of sclerosing solutions (he prefers to call them proliferants) blindly injected into the fibro osseous junctions of tendons and ligaments with bone His thesis is that stress from trauma poor posture and overweight causes back ache by producing pain in the numerous joints throughout the osseous complex of spine sacrum and ilium and, that this pain is due to relaxation of ligaments in which lamellated nerve fibers are stretched No contraindications are given to the injection of two proliferants sylnasol and a zinc sulfate phenol pontocaine solution This would win few supporters among those experienced with complications associated with blind injection of sclerosing solutions especially those containing phenol One wonders if the book does not condemn itself in the statement We can no longer accept as accurate clinical observations that are without scientific basis "

—*WALTER R MILLER Capt MC USN*

CIRCULATION dit d by *J h M M h l* M. D F R C P F R S 503 p g ll t t d Ch l C Th m P bl he Sp gf ld Ill 1958 P $10 50

This book is a compilation of the p pers presented in 1957 at the *Harvey Tercentenary Congress at the Royal College of Surgeons in* London The progr m presented the work of 60 outst nding authorities r presenting practically all disciplines interested in blood circulation As appropriate in such a congress pleasant and necessarily all too short historical survey of Harvey s life and the results of his investi g tions comprise the first part of the book The remainder of the text is devoted to a review of the present knowledge of the circulation wherein investigators physiologists clinici ns and surgeons present concise summaries of work which in many cases was performed in their own laboratories An interesting f ature is the nclusion of the transatlantic radio telephone discussion held between m mbers of a panel in London and another at the annual meeting f the American Medical Association in New York which followed the presentation of the papers on cardiac surgery The tables and illustrations are un formly good throughout the book a d are especially valuable in permitting a non Fr nch speaking reader to understand the only one of the paper not wr tten in English This volume is recommended to all interested in the study of the circulation from the casual reader of medical history to the investigator who wishes a nonparochial survey of the entire field.—*M. S WHITE B ig Gen. USAF (MC)*

CALLANDER S SURGICAL ANATOMY by *B rry J A* M A. Ph D and *W lt G M dd k* M S M D F A C S 4th d ti 1 157 p ge 1 047 ll t t o W B S d C mpany Philad lph P 1958 Pr c $21

The fourth edition of this well kn wn standard text follows the general format of its predecessors significant changes being based on fairly recent developments in the field of surgery The book attempts to be all things to all men with the result that there are bones for all but meat for few To be more specific the book discusses the anatomy physiology and embryology of problems in many surgical specialties and thereby as a result of the limitations imposed by space much material is sketchily presented For instance bronchiecta sis is disposed of with two paragraphs and carcinoma of the lung with four The brief discussion of cardiac surgery is obsolete On the other hand items of particular interest to the author such as the vagaries of the blood supply to the diaphragm receive much more space than their importance warrants A fairly complete discussion of the subject of diaphragmatic hernia does not mention Humphry s classic contribution and fig 276 does not agree with the written description of the esophageal hiatus In many instances there is a mixture of both English and Latin nomenclature to explain a figure This text is valuable as a reference as it generally gives the source of the material it condenses It will be of most interest to under graduates and to those beginning their postgraduate training

—*DAVID E. THOMAS Lt. Col. MC, USA*

EYE SURGERY by *H B Stallard* M B F M A M D (Cantab) F R C S (Eng) Hon LL D (St Andrews) 3d edition revised 899 pages 671 illustrations The Williams & Wilkins Company Baltimore Md 1958 Price $18

This book describes the details of operations which have an established place in ophthalmic surgical practice The author does not present an exhaustive treatise or detailed analyses of every surgical procedure but describes procedures he has found most effective in his experience and practice The third edition of this book has been extensively rewritten There are 671 illustrations clearly drawn or photographed which augment the written descriptions of surgical procedures The chapter on anesthesia has been brought up to date and includes descriptions of the administration of basal narcotics curare and the hexamethonium compounds Here is a complete concisely written textbook of eye surgery that is recommended to the beginning ophthalmologist as well as the more experienced eye surgeon

—*JESSE H SUTTOR Capt MC USN*

PHYSICAL EXAMINATION OF THE SURGICAL PATIENT by *J Englebert Dunphy* M D F A C S and *Thomas W Botsford* M D F A C S 2d edition 375 pages illustrated W B Saunders Company Philadelphia Pa 1958 Price $8

With the emphasis in modern medicine on complex laboratory diagnostic procedures the art of personal rapport with the individual patient and his thorough examination is becoming less common with the practitioners of medicine This book has been written to focus the attention of the student and practitioner on the elementary principles and importance of eliciting the physical signs in surgical conditions Although some attempt is made to correlate the physical signs with the pathologic processes producing these signs it is of course impossible to do so thoroughly in a volume of this size The book is divided into discussion of the elective examination and of the emergency examination Both are well written in clear and concise language The second part would appear to be of more value The procedures of examining an injured patient are well presented in a form not readily available in the usual textbooks of surgery Students interns and junior trainees in a surgical program should find this book of considerable help in organizing and orienting their thoughts and procedures in the examination of surgical patients—*CLINTON S LYTER Col MC USA*

SURGERY OF THE HEAD AND NECK by *Robert A Wise* M D and *Harvey W Bake* M D 319 pages illustrated The Year Book Publishers, Inc Chicago Ill 1958 Price $9 75

Surgery of the head and neck conceivably ranges from ventriculocisternostomy to anterior fusion of the lower cervical vertebral bodies, and from corneal transplant to stapes mobilization These examples are from the legitimate and virtually exclusive preserves of established specialties but there is much in the head and neck which is still properly within the province of the general surgeon This book was written for the general surgeon It treats of skull fracture

skin tumors the Estlander l p and ma dibulectomy pist xis a d branchial cleft cyst nte or mediastinotomy and fishbones in the thro t The text and illustrations are in the well known tyl of former h ndb oks—pertin nt clear and br f Th b k should be of particu lar v l to any gene al surgeon who i ot l e dy an accomplished expert in th area of th head and the neck—the result either of an over p cialized residency system or a lack of continu ng cl nical experience The book will not make him an expert but it w ll better prepare him for th cases th t do d mand his attention

—*DOUGLAS LINDSEY Lt C L MC USA*

DIAGNOSTIC BACTERIOLOGY by *I b ll G S h b* A B *M K thl F l y* M A *El y G S tt* M T (ASCP) nd *W R b t B l y* Ph D 5th d t 338 p g ll t d Th C V M by C mp y St L M 1958 P $4 75

This excellent m nual for the journeyman medic l b ct iologist emain as pe haps the best urce of diagnostic m utiae avail bl To thi the authors have added a fathom ble section on d agnosis f mycotic infectio s wh h incorporates most of the Conant drawings from his manu l *Cl nical Mycology* Oth new m t r al includes a r working of the enti e sect on on gram neg tiv rods with special ttention to th *Pa acolobactrum* P bly in light of author Schaub s contribut on to our nformation on *Bacterium a t atum* some ffort m ght have been exp nded in differentiating *M ma polym rpha* from the *Herell a* pecies because the organisms are b ng isol ted more oft from patholog c processes For the physic an desir ng an asy re d ble guide to isolation and identif cation of pathog nic b teri nd fu gi this work is cur nt and choic

—*CHARLES D GRABER Lt C L MSC USA*

TUMORS OF THE ORAL REGIONS d t d by *H m lt B G R b* D D S M S 143 p g ll d W B S d C mpany Ph l d lph P 1958 P $3

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Cabot, R. C. Hermelou and secondary hemia, chloroma and leukemia. In Oliver, W. (editor): *Modern Medicine*, 3d edition. Lea & Febiger, Philadelphia, 1a., 1921. Vol. 3, pp. 33–100.

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Humerus Fractures from Muscular Violence

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CLINICOPATHOLOGIC CONFERENCE ☆ CASE REPORTS

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Monthly Message

A picture of Surgeons General H ys USA and Niess USAF and Deputy Surgeon General Admiral Bruce Bradley USN together with representatives of the Standardizati n Committee Dr Cu hing and me appears in this issue During World War II there w s much confusion when it became necessary to hospitalize members of one military serv ice in an installation of another This was due to the multipl city and d fference of administrative forms reports and statistical procedures uniqu to each service

In 1948 Sec etary of Defense Jam s V Forrestal established a pro gram to st nd rdize these fo ms and procedures as a means of promoting unification of the military medical services nd subsequently responsi bility wa assigned for the program to the Director of Medical Serv ces Off ce of the Secretary of Defense This assignment h s continued and today constitutes one of the m e import nt activities of the Assistant Secretary of Def nse (Health and M dic l) Staff functions required for the effect ve operation of this program have been performed by the three directors of the military Med cal Stati tics Divis ons Through their efforts over 100 medical forms a medical nomenclature and stati tical classification and numerous m dical recording and reporting procedures have been standardized In addition several forms and procedures have been standardized with NATO and other foreign countries

Th program h s been most successful and t day increasing unifica tion of the milit ry medical services in these procedures is established and well accepted T ansfer of patients among departments and joint use f medic l services and facilit es are common pract ces biometric and other medical data are interchanged freely and comparable statisti c l data are available for bett r management of med cal services These advances have steadily imp oved efficiency economy and ffectiveness of milit ry support

A we take cognizance of the tenth year of the operation of the pro- gram a letter of appr ci tion from this office has been presented to each of the chiefs of the M dical Statist cs Divisions of the three serv ces

Biostatistic a e of value in direct propo tion to their comparability The ttainments along unified lines so far accompl shed have re ulted in easier procedures in cross servic ng among the hospitals of the three services i e admissions of p tients of one service to hospitals of other services The program continuing with one of the major goals a r v sion of the nomenclature and stat stical abstract with early com- plet on expected

Frank B Berry

FRANK B BERRY M D
As istant Sec etary of Defens
(H alth and M di al)

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THE TREATMENT OF CARDIAC ARREST FOLLOWING MYOCARDIAL INFARCTION

JOHN G McGREGOR *Captain MC USA*
DWIGHT E NEWTON *Captain USAF (MC)*

THE high incidence of death from cardiac arrest secondary to myocardial infarction has made the study of this entity of interest and concern to physicians who care for cardiac patients The *majority of sudden deaths following myocardial* infarction are due to ventricular arrhythmias, predominantly ventricular fibrillation Garrey[1] and Wiggers[2] were among the first investigators to show that ventricular fibrillation could be abrogated and reverted to normal rhythm by the application of cooling agents to the heart, by the administration of solutions containing potassium, and by electric countershock These investigations were rapidly followed by the clinical application of resuscitative technics to patients who sustained cardiac arrest while undergoing surgical procedures Johnson Kirby, and Dripps [3] [4] Stephenson, Reid, and Hinton [5] and many others pioneered this work developing technics and achieving a remarkable degree of success

The clinical application of resuscitative technics has been confined primarily to surgical patients and has been restricted to those accidents which occurred in the operating room There has been little enthusiasm for the application of these new technics to medical patients in whom myocardial infarction was the cause of the ventricular fibrillation The work on dogs by Wiggers[6] [7] in 1936 and again in 1940 indicated that defibrillation was difficult to achieve when the coronary arteries were permanently occluded Some unpublished work by Papper[8] also seemed to indicate a very *questionable medical applicability for the* procedure

From Brooke Army Hospital Fort Sam Houston Texas Captain McGregor is now assigned Army Medical Service School Fort Sam Houston Texas

During the last two years, three cases of successful cardiac resuscitation were reported in patients who had cardiac arrest resulting from myocardial infarction [1] In each of these cases an antecedent myocardial infarction probably had occurred and the technics of emergency thoracotomy, cardiac massage, artificial respiration, and defibrillation by electric countershock were employed successfully Unfortunately, the reports of failure in similar cases cannot be found in the literature Until the successful instances are compared with the failures, no accurate appraisal of the true worth of this procedure to the medical patient can be made It is the purpose of this report to record the experiences of the medical staff of this hospital with patients who developed cardiac arrest following myocardial infarction and who received emergency thoracotomy, cardiac massage, and attempted defibrillation The fourth successful resuscitation of such a patient also is reported

REVIEW OF THE LITERATURE

Ventricular fibrillation may be defined as an incoordinate type of contraction wherein no useful work is performed by the ventricular musculature despite a very high metabolic rate As a result of such ventricular activity arterial pressure rapidly falls, coronary perfusion ceases as does the flow of oxygenated blood to the vital centers of the central nervous system and death occurs within six to eight minutes as a result of anoxia of the brain and spinal cord

The cause of ventricular fibrillation is uncertain despite a large amount of research Myocardial hypoxia appears to be a predisposing factor and probably exists as the common denominator in all cases More than simple anoxia or hypoxia however is required to produce ventricular fibrillation Some type of stimulus seems to be necessary Wiggers[12] and Mines [3] showed that an electric stimulus applied to the myocardium during the inscription of the electrocardiographic T wave (during the last 0 06 seconds of electric systole) would precipitate ventricular fibrillation The amount of current required to induce the fibrillation could be altered by the degree of hypoxia of the myocardium The matter rested in the medical literature at this point until Beck and Leighninger[4] proposed the principle of self electrocution

Beck and Leighninger began by demonstrating that the totally anoxic myocardium was relatively resistant to spontaneous fibrillation They then showed that two adjacent but differentially oxygenated areas of myocardium had measurably different electrical potentials They proposed that this difference in potential acting across the transition zone could serve as the electric trigger to induce fibrillation This situation is thought to occur in hearts which have sustained myocardial infarction *secondary to coronary occlusion*

Whatever the cause once ventricular fibrillation begins it is a continuously evolving series of events which Wiggers studied

by slow motion cinematography It was shown that fibrillation begins as an aberrant premature ventricular contraction Wave fronts from this contraction spread unevenly over the myocardium, causing the formation of several large areas of independently contracting muscle At this stage the heart appears to be convulsing Each of these large areas becomes subdivided into smaller and smaller units until the myocardium consists of a multitude of minute areas of contracting muscle producing the "bag of worms" stage of fibrillation No co-ordinated or effective beat can be produced and cellular anoxia rapidly occurs as a result of the high metabolic rate of such activity and the failure of coronary perfusion Unless this cycle is interrupted and coronary blood flow re established, the co-ordinated beat of the myocardium cannot be re established

Successful resuscitation depends on the prompt recognition that cardiac arrest has occurred and the rapid introduction of treatment The diagnosis should be based on the abrupt onset of coma, cyanosis, absence of heart sounds, inability to obtain blood pressure, or peripheral pulses, and apnea The absence of arterial pulses is best determined by palpation of the femoral or carotid arteries This and the absence of heart sounds are the best signs of cardiac arrest Other signs are unreliable and the search for them causes an unwarranted loss of time Electrocardiographic confirmation of ventricular fibrillation is unnecessary Generally speaking, emergency thoracotomy is indicated if arterial pulsations cannot be felt If the patient is in a hospital and a device for external defibrillation is present, this should be given a trial before thoracotomy and cardiac massage Defibrillators are increasingly available in hospitals and in the instances in which the patient is in a critical condition very little time is lost in trying it if the instruments can be kept close by

Once the diagnosis of cardiac arrest is established, the physician enters into a race with time The most pressing problem is to deliver oxygenated blood to the central nervous system and the fibrillating myocardium Stephenson Reid and Hinton and Cole and Cordav[1] agreed that cardiac massage must be begun within four minutes if successful resuscitation is anticipated This is to say that the diagnosis must be established, thoracotomy performed, artificial respiration begun, and cardiac compression instituted within four minutes Permanent cardiac and central nervous system damage usually will result if this time is exceeded Once cardiac massage has been instituted and cardiac output has been temporarily restored, attention can be directed to the conversion of the fibrillation to a normal rhythm by electric countershock

Thoracotomy and cardiac compression can be carried out by any physician and does not require the presence of a surgeon Successful resuscitation does, however, require the presence of a second person capable of establishing and maintaining an airway and administering oxygen and artificial respiration Cardi

ac resu citation should not be attempted without the presence of this second person

The technic of thoracotomy is relatively simple An incision is made in the left fourth or fifth anterior intercostal space from the left sternal border to the anterior axillary line No attempt to obtain sterile conditions is made As the pleura is entered the left lung collapses and the right hand can easily be inserted into the chest The heart is grasped so that the thumb is anterior and the four fingers are posterior Compression is instituted through the intact pericardium either by squeezing the heart or by compressing it against the sternum It is helpful to wedge the left fist vertically between the ribs or to cut the costal cartilage of the superior rib to keep pressure off the right wrist

In order to be most effective cardiac massage should produce a palpable carotid pulsation The rate of compression should be about 60 to 85 beats per minute Compression of the heart should be accomplished with the flat of the fingers through the intact pericardium to avoid perforation of the myocardium It usually is not necessary to compress the descending aorta to obtain adequate cerebral and coronary blood flow

The flow of oxygen to the lung must be established simultaneously with the onset of cardiac massage Insufflation of oxygen through a tight fitting face mask by means of an intermittent positive pressure breathing apparatus manually operated is a useful method which will suffice until an anesthesiologist and his equipment arrive When no special equipment is available mouth to-mouth respiration can be used effectively It is advisable to compress the abdomen occasionally to prevent overdistention of the stomach when such methods are used

Once cardiac compression and the insufflation of the lungs are established the dire emergency subsides Now the heart must be defibrillated Experience dictates that it is best to await the surgical anesthetist team before attempting defibrillation The method of choice is electric countershock The pericardium is opened and countershock of at least 130 volts for 0 1 seconds is delivered to the myocardium by flat 5 cm electrodes applied anteriorly and posteriorly A standard type of defibrillator is essential The shock is usually followed by ventricular standstill It may be necessary to continue cardiac massage until the ventricle maintains a rhythmic beat Repeated shocks may be employed if ventricular standstill is not obtained If repeated shocks are not successful procaine amide hydrochloride calcium chloride epinephrine sodium lactate or potassium chloride should be given into the left ventricle The exact sequence of drugs depends upon the operator

The question of when to terminate cardiac massage if all measures fail is still a problem The presence of persistent atony of the myocardium diminished electric activity by electro-

cardiography, and fixation of the pupils are sufficient reason to discontinue further resuscitative efforts

If cardiac resuscitation has been successful and the patient maintains a sinus rhythm and adequate blood pressure, the chest may be closed by the surgeons It has been found advisable to perform the closure on the ward using local anesthesia, rather than transport the patient to the operating room Care after resuscitation usually is given by cardiologists and consists primarily of the routine treatment of a patient with myocardial infarction The chest wound is managed in the usual manner by members of the surgical service Antibiotics should be given routinely, although this type of unsterile procedure usually is not followed by infection

CASE REPORTS

Case 1 A 51 year old automobile mechanic was admitted to this hospital on 18 July 1957 complaining of crushing substernal chest pain of one hour s duration The patient had a nine month prior history of angina pectoris relieved by nitroglycerin He had had no symptoms of congestive failure and no prior history of heart disease When seen in the emergency room he was found to have a blood pressure of 200/90 mm Hg and a pulse rate of 102 per minute He was then admitted to the cardiology service where he was noted to have a blood pressure of 140/90 mm Hg and a pulse rate of 124 per minute with bigeminy The remainder of the physical examination revealed no pertinent abnormalities and the patient appeared free of pain was perfectly lucid and rational

About one half hour after admission the patient again began to complain of crushing substernal chest pain and to appear apprehensive He was given morphine sulfate intravenously and an electrocardiographic tracing was begun The standard and augmented limb leads showed no diagnostic pattern As lead V was being taken the pattern of ventricular fibrillation appeared (fig 1) One minute later the left chest was entered through the fifth anterior intercostal space with no effort to maintain sterile technic The heart was found to be fibrillating palpably and had good tone Massage was started at a rate of approximately 80 contractions per minute and oxygen was delivered to the lung by means of a Bennett intermittent positive pressure breathing apparatus using a face mask and operating the breathing cycle manually The cardiac massage was vigorous enough to produce a faint carotid pulse The lungs were noted to be visibly inflated and the patient s color remained fair

A surgical anesthetist team arrived 25 minutes after the onset of fibrillation An endotracheal tube was inserted and positive pressure insufflation of the lung with 100 per cent oxygen was instituted The pericardium was opened and a defibrillating shock of 130 volts for 0 1 second was delivered through electrodes placed on the anterior and posterior surfaces of the myocardium The heart went into complete standstill for a brief instant and then slowly resumed a rhythmic beat about 30 minutes after the onset of fibrillation The electrocardiogram

following defibrillation The use of drugs while sometimes helpful does not serve as a substitute for the positive resuscitative measures of thoracotomy and cardiac massage followed by electric defibrillation

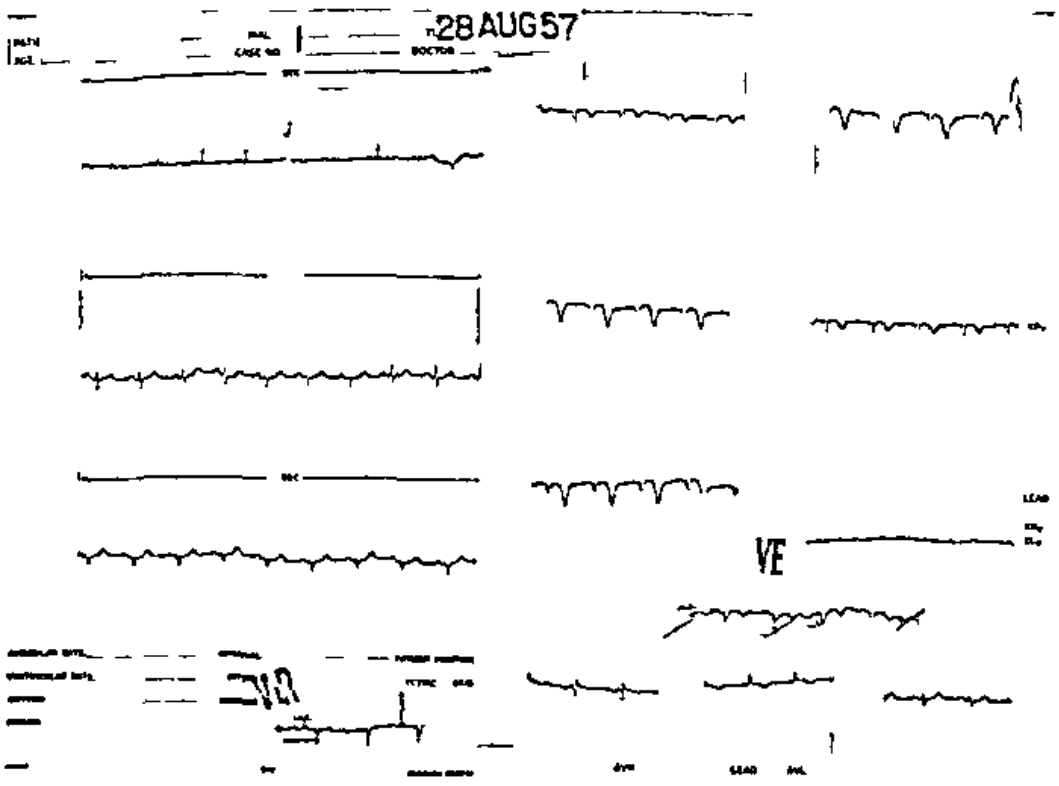


Figure 3 (Case 1) The lead designated as the patient's ECG monitoring showing abnormal elevation of the lateral limb leads. Changes of acute pericarditis. Compare the ECG with the lead showing S-T segment and monophasic T wave.

Case 2 A 39 year old Air Force pilot was admitted to this hospital on 31 January 1957 because of gastrointestinal hemorrhage Physical examination and diagnostic studies failed to reveal bleeding site although moderately severe esophagitis was noted on esophagoscopy The patient was treated symptomatically and replacement transfusions were given to correct an initially low hemoglobin His convalescence from the gastrointestinal hemorrhage was uneventful

Three weeks following admission the patient was lying quietly in bed when he suddenly rolled from his bed to the floor His body became rigid cyanosis appeared about the face and neck and no respiratory effort could be seen About a minute later a physician arrived and found the patient completely flaccid gasping occasionally but without palpable pulse or audible heart tone Positive pressure oxygen was administered by mask and artificial respiration was carried out by compression of the thorax cage The surgical officer of the day was sought and arrived some six minutes after defibrillation had begun

An emergency thoracotomy was performed and the heart was noted to be in complete standstill Cardiac massage was instituted about

nine minutes after collapse of the patient About two minutes later an anesthetist arrived and inserted an endotracheal tube and positive pressure insufflation of the lungs commenced The heart was flabby at the beginning of massage and after a few minutes of massage the tone improved and ventricular fibrillation was noted During the 90 minutes following arrest continuous cardiac massage and pulmonary insufflation were carried out and six repeated attempts at electric defibrillation using gradually increasing voltage up to a maximum of 180 volts for 0 1 second were without success Intravenous in fusion of Norepinephrine was begun without visible effect Calcium



F gure 4 (ca e 1) Photog aph of pat ent shou ng tl e type of c s on u ed and t placem nt o the chest

chloride was injected several times into the left ventricle and after about two hours of massage the ventricles began to develop a rhythmic beat The electrocardiogram (fig 5) showed an abnormal ventricular complex with ventricular rate between 80 and 90 beats per minute This gradually changed to a sinus rhythm The systolic blood pressure rose to 100 mm Hg and the patient began to blink his eyes and show signs of awakening The chest wound was approximated with towel clips and the patient transported to the operating room for closure of the wound The closure was carried out without untoward incident using intravenous thiopental sodium anesthesia and the patient main tained a sinus rhythm throughout this procedure Shortly after com pletion of the closure of the chest wound the patient s respiratory rate suddenly slowed and became irregular and a tracheotomy was performed The patient abruptly went into respiratory arrest and posi tive pressure pulmonary insufflation was again begun and carried out

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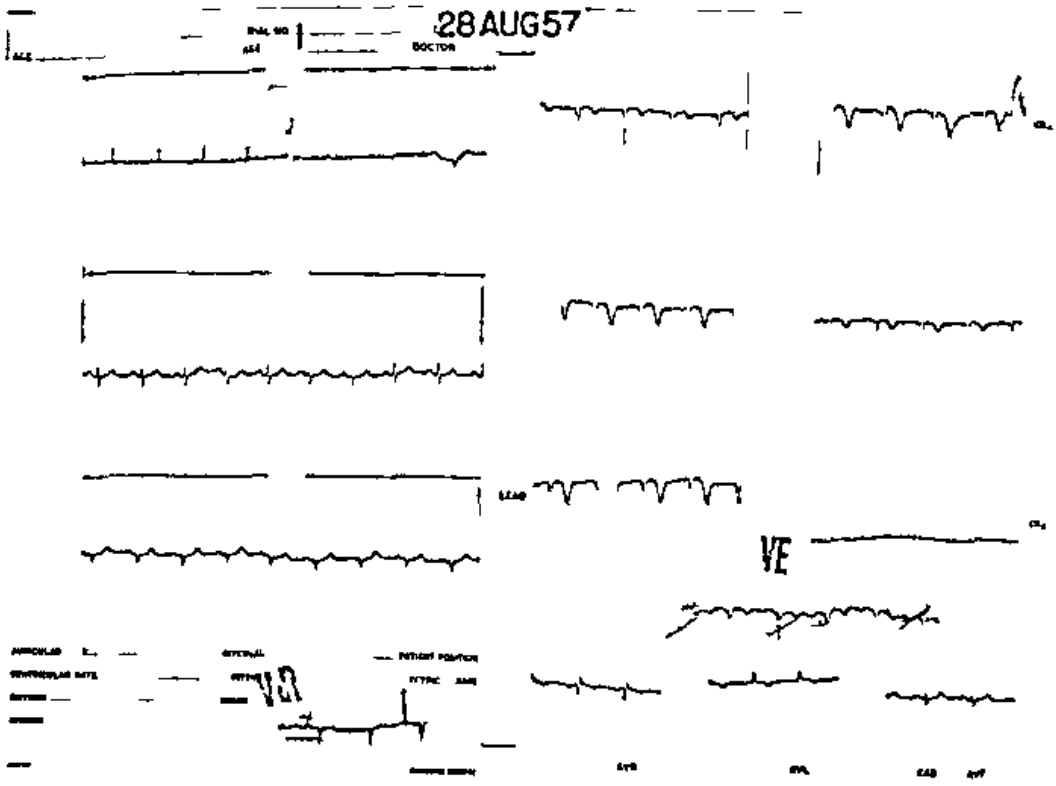


Figure 3 (Case 1) The first tracing was made with the patient in the supine position and shows a bizarre ventricular complex of abnormal configuration and large amplitude. Following this there is a change of rate to a ventricular bigeminal rhythm. Compare the positive deflection of the ST segment and monophasic T wave in lead V with the negative deflection of the ST segment and diphasic T wave in lead V

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a patient develops cardiac arrest Time is entirely too precious to waste on artificial respiration, injection of drugs, or frantic searching for a surgeon

The use of calcium chloride which, in this case, seemed to produce a rhythmic ventricular contraction after six attempts at electric defibrillation failed, indicates that chemical agents are sometimes effective and should not be forgotten The use of sodium lactate by Bellet, Wasserman, and Brody[17] in ventricular arrhythmias, and Wiggers[2] use of potassium and calcium salts provide additional experimental support for clinical use It should be emphasized that in most cases the use of drugs supplements electric countershock, but does not supplant it

The use of general anesthesia while closing the chest probably was unwise and added to the central nervous system damage Adequate wound closure can be performed using local anesthesia on the medical ward where cardiac arrest has occurred

Case 3 A 46-year-old construction worker was admitted to this hospital on 23 June 1957 with the complaint of crushing substernal chest pain of three hours duration Nine months prior to this admission the patient was hospitalized for a posterior myocardial infarction from which he had an uneventful convalescence He had been maintained on an outpatient regimen of restricted activity sedatives and a low fat low salt diet Physical examination on admission revealed a blood pressure of 140/70 mm Hg and a pulse rate of 100 beats per minute There was no evidence of cardiac decompensation

The patient was given meperidine hydrochloride intravenously and an electrocardiogram was begun The standard and augmented limb leads showed evidence of an old posterior myocardial infarction and as lead V_2 was being taken the tracing abruptly changed to the pattern of ventricular fibrillation The patient became comatose the blood pressure and cardiac sounds were unobtainable Quinidine was given intravenously and the chest was pounded vigorously An emergency thoracotomy was performed four to five minutes after the onset of fibrillation and cardiac massage was begun The heart was flabby and fibrillating palpably One and one half minutes after the onset of massage an endotracheal tube was inserted and positive pressure insufflation of the lungs begun Following this repeated intracardiac injections of procaine amide hydrochloride and calcium chloride did not alter the fibrillation After one and one half hours of massage a regular idioventricular rhythm developed and was maintained for approximately ten minutes There was no attempt at spontaneous respiration during this period and ventricular fibrillation again recurred Attempt at electric defibrillation two hours after arrest was unsuccessful and an electrocardiogram revealed progressive decrease in the electric activity Cardiac massage was discontinued three hours after arrest

Autopsy revealed acute passive congestion and hemorrhage of the myocardium as a result of cardiac massage an area of myocardial

fibros s in the posterior aspect of the left ventr cle near the apex and a marked generalized atherosclerotic narrowing of the lumen of the coronary arteries No ind cation of acute myocardial infarction or total occlus on of any artery was found

Comment This case illustrates the premise that no time should be wasted by injecting drugs into either peripheral veins or the left ventricle because drugs are undependable in altering ventric ular fibrillation It is doubtful if drugs injected in this manner ever reach the coronary bed when the ventricle is fibrillating A minimum of time should be allowed to elapse between cardiac arrest and resuscitation Even the use of external electric de fibrillation as advocated by Zoll[1] is questioned on the grounds that the equipment is not ordinarily available and if the attempt is unsuccessful much valuable time has been lost The patient with cardiac arrest must have oxygenated blood delivered to the central nervous system and myocardium within four minutes following the arrest The only predictable method of obtaining this goal is the manual emptying of the exposed heart

Case 4 A 53 year-old housewife w s admitted to th s hospital on 2 February 1957 because of congestive heart failure of two weeks duration The patient had a 20-year past history of d abetes mellitus w th good co t l Physical ex m nation revealed a blood pressure of 120/80 mm Hg and a pul e rat of 104 per m nute There was marked d abet c reti p thy prominent d stent on of neck v ins and bil ter l bas l r pulmon ry rales The l ver w s palpable 8 cm below the ght costal m rgin and severe pitting edema w pres nt from kn e to ankles An electrocardiogr m revealed an old anteros ptal myocard al nfarct n

The p tient was digitalized orally nd placed on mercuri l diuretics a low salt d abet c diet nd n ul n coverage at approp iate dosage On the f fth hospital day the pati nt was essentially clea of her chronic conge tive heart f ilure and was sitt ng n a whe l cha r at her bed de when she uddenly becam comatose and was imm di t ly pl ced b ck n bed The pat ent had absent pe iphe al pul es and no card c ounds ould be he rd Approxim tely five mi tes later an elect rd ogram showed entr cular f br llat on Em rgency thor co-tomy w s perfo med by the ward physician approxim tely eight minutes aft r h r collaps The heart w found to be fl bby and in st nd till Card m ag w begun but art ficial respirat on was not ef fectiv ly carr ed out The surgical nesthetist team arrived w thin the n t few minute a d an endotracheal tube was in erted a d po itive p essu n ufflat on of the lu gs begun Forty five min tes after a r st tt mpted lectric defibr llation produced card ac st nd still followed by etur of the s nus rhythm with abnorm lly wide QRS complex A b i f run of ormal sinus hythm was maintai ed following which ventr cular fib llat on eturned and over a period of the next hour inc e s ng am unts of electric counter hock were neffect ve in obtain ng d f brillat o El ct ic activity of the he rt p ogr ssively decreased and c rd c ma sag wa discontinued two hour after arr st

Autopsy revealed an old extensive anteroseptal myocardial infarction with a fresh thrombus occluding the right coronary artery

Comment This case illustrates the utter futility of attempting to confirm the diagnosis of cardiac arrest by electrocardiogram The manner in which the patient collapsed and the physical findings were sufficient in themselves to establish the diagnosis and dictate emergency thoracotomy Approximately eight minutes elapsed between collapse and the onset of cardiac massage On entry into the chest, the heart was flabby which, we have come to realize, is an extremely grave prognostic sign The heart was rather easily defibrillated but the myocardial anoxia was so prolonged that rhythmic beat could not be maintained by the damaged muscle and conduction system

Case 5 A 71 year old man was admitted to this hospital with a one hour history of crushing substernal pain The patient was said to have had a five year past history of angina pectoris relieved by nitroglycerin On admission to the medical ward the physical examination revealed no palpable peripheral pulse no obtainable blood pressure no audible heart tones There was marked cyanosis of the face neck and upper thorax An electrocardiogram showed rapid ventricular fibrillation Oxygen was administered by face mask with an intermittent positive pressure breathing apparatus and the left side of the chest was entered 12 minutes after the patient collapsed Cardiac massage was carried out until the arrival of the surgical anesthestist team at which time the pericardium was opened and several attempts at electric defibrillation were without success Calcium chloride and epinephrine given intracardially were also without effect Because of the progressively increasing subepicardial hemorrhage and decreasing electric activity of the heart resuscitative efforts were discontinued two and one half hours after cardiac arrest had occurred

Autopsy showed extensive subepicardial hemorrhage involving the apex and the anterior ventricular wall There was generalized severe arteriosclerotic narrowing of the coronary arteries with an acute occlusion of the anterior descending coronary artery 1 cm from the coronary orifice

Comment This patient had sustained cardiac arrest at some time prior to his arrival on the cardiology service and attempt at resuscitation was a desperation measure The myocardial damage and anoxia were so severe that defibrillation was not successful The justification for attempting cardiac resuscitation was that the time of onset of cardiac arrest was unknown The confirmation of the diagnosis by electrocardiogram was unnecessary and prolonged the time between arrest and treatment

SUMMARY AND CONCLUSIONS

The high incidence of deaths from cardiac arrest secondary to myocardial infarction has made this entity of prime concern to all physicians The majority of deaths are due to ventricular arrhythmias predominantly ventricular fibrillation The mecha

nism of ventricular fibrillation although not thoroughly understood may be related to differential hypoxia of the myocardium In cardiac resuscitation it is imperative that cardiac compression and pulmonary insufflation be instituted within four minutes after arrest

In five patients with cardiac arrest secondary to myocardial infarction at an Army hospital resuscitation was attempted Two of the patients were resuscitated successfully and one is alive and doing well except for moderate angina pectoris The other patient died one hour after resuscitation from central nervous system damage probably the result of unnecessary delay before cardiac resuscitation was instituted

The measures necessary for resuscitation of patients who have sustained ventricular fibrillation are not applicable to all patients or to all situations There are medicolegal aspects which have not yet been clearly defined Our experience indicates the following criteria to be useful guides in selecting patients for this procedure Keen professional judgment is paramount in applying them to the individual patient

1 To be amenable to emergency resuscitation procedures the catastrophe of ventricular fibrillation must occur to the patient in a hospital environment It seems unreasonable to attempt such extreme measures in the street or in the home

2 The physical findings indicating cardiac arrest (apnea absent arterial pulsations cyanosis coma and convulsions) should occur in an appropriate clinical context That is to say there should be an antecedent myocardial infarction cardiac rhythmia electrocution accident or other similar clinical setting wherein cardiac arrest is known to be a complication

3 The time of onset of the cardiac arrest must be known with approximate accuracy The time interval from cardiac arrest to successful resuscitation is believed to be less than four minutes It therefore would seem futile to attempt resuscitation on patients who have had ventricular fibrillation for a greater length of time It is probably best to err on the side of attempting the resuscitation should the time interval appear questionable

4 At least two persons must be available to perform the resuscitative procedure One person probably should be a physician and should perform the thoracotomy and cardiac compression The second person must be able to establish a patent airway and administer artificial respiration

5 A surgical anesthetist team should be available within one hour Cardiac compression itself produces myocardial damage and when continued for more than one hour usually precludes defibrillation The hypoxia of the central nervous system and the myocardium are only partially corrected by cardiac compression and artificial respiration and the amount of damage to both structures becomes excessive after this time

6 The prior clinical condition of the patient must be evaluated The presence of multiple previous myocardial infarctions, the presence of severe systemic disease, and the age of the patient must all be considered in the decision to attempt cardiac re suscitation

Our experience, coupled with that of others,[9-11] indicates that some patients who have sustained cardiac arrest secondary to myocardial infarction can be successfully resuscitated Phy sicians must be made more aware of the entity of ventricular fibrillation and the possibilities of therapy Resuscitative measures are heroic, however, the salvage rate is great enough to justify the effort if even an occasional patient is saved

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ADDENDUM Since preparation of this manuscript an additional case of resuscitation following myocardial infarction has been reported Bloomfield and Mannick[1] have provided documentary evidence from the Massachusetts General Hospital of a myocardial infarction causing ventricular fibrillation They were able to obtain complete resuscitation by means of emergency thorac tomy and cardiac massage

REFERENCES

1 Gart y W E Aur l r fib ill t o *Physi log cal Rev* 4 215 250 Ap 1924

2 W gg C J Stud f v t icul f b ll t c d by lectric sh ck r iv l of h rt f m ntr c lar f br ll t n by cess us f pot s um nd lc um lt *Am J Phy l* 92 223 239 F b 1930

3 J h J K rby C K nd D pp R D D f b ll t of v t I s by l tr c hock w th omplet r ry *Ann Surg* 134 116-118 July 1951

4 J h s n J and K rby C K Surg c l tr tm t f tr lar f br ll t n *Ann Surg* 134 672 682 O t 1951

5 St ph H E J R d L C d H t J W P tf ll pr c t d c mpl c t s card u t t tudy of 1200 c *A. M. A. Arch Surg* 69 37 53 J ly 1954

6 W gg r C J C rdi ma g f ll w d by unt h k vi l f m mm l tr l f om f b ll t d to c r ry o clus (Pr ed g f Am Phy l g c l S ty) *Am. J Physiol* 116 161 162 1936

7 W gg rs C J Phy l g b s f d r t t f m v nt ul f br llat —m thod f r s r l d f b ll t *Am. Heart J* 20 413 422 O t 1940

8 P pp r C t d f 10

9 R g L B Young K R d N ch I J W V tr ular d f b ll t p t t w th p b bl t ry cl *Surgery* 39 482 486 M 1956

10 C l o A. Ca d t t d w th r ry c lus ful re s c t t n *J I ternat Coll Surgeon* 25 299-305 M 1956

11 B k C. S W k E C. and B rry F M F t l h art tt ck a d ucc s ful d fibr ll t n w pt c r ry rt ry d *J A M A.* 161 434-436 Jun 2 1956

12 W gg rs C J Muscul rea t s of m mm li ventr l to artif c l urf c t mul *Am. J Phys ol* 73 346-378 J ly 1925

13 M s G R. O r l t ry t tu in heart m scl nd their poss bl re lati t t chycard nd f b ll t n. *T ans Roy Soc Canada.* S r s 3 8 42 1924

14 B ck C S d L gh g D S Ope tu ns f r c r ary rt ry d ea e I Am r c M d l A s t u A. M A S s t f c E hib t 1955 [Spo o d by C un l Sci t f Ass mbly] Grun & Str tto I c. N w Y rk N Y 1955

15 W gg rs C J M ch sm nd ture f tricular fibr ll t *Am. H art J* 20 399-412 Oct 1940

16 Col S L nd Co day E Four-minut l mit for c rdi c r us st ti *J A. M A* 161 1454 1458 A g 11 1956

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MILITARY INDUSTRIAL HYGIENE

U S Armed Forces Program in Far East

E ELBRIDGE MORRILL Jr M P H

IN 1954, the Surgeon General, Department of the Army, made a request of the Surgeon General, U S Public Health Service, for the assistance of an industrial hygiene engineer to conduct an initial survey of the Army Forces Far East (AFFE) installations in Japan and Okinawa to determine whether or not initiation of an industrial hygiene program was warranted in the Far East Mr Henry N Doyle, then Senior Sanitary Engineer, Occupational Health Program, U S Public Health Service, made the survey in March and April of 1954 [1]

This survey took into consideration the actual and potential health hazards confronting a work force of about 190,000 Japanese nationals employed in installations of the U S Armed Forces as well as the numerous Army, Navy, and Air Force military and civilian personnel holding supervisory positions The terms of employing Japanese nationals under the Master Labor Contract also had to be considered

Arrangements for employment payment of wages on a reimbursable basis, and administrative details have been negotiated periodically between the U S Armed Forces and the Procurement Agency, an instrument of the Japanese Government, through the master labor contract Under its terms the Agency has been responsible for administering the Workmen s Compensation Act and Workmen s Health Insurance, for making health inspections and for giving physical examinations to the Japanese nationals employed The funds required for these responsibilities have been furnished to the Agency by the U S Armed Forces through an administrative fee This fee amounts to about $20 per month per employee Approximately one third of the fee covers items of medical importance The contract has been based in part on the safety and health experiences at American military installations during the previous year Thus in essence the costs of illnesses and accidents have been borne by the U S Armed Forces Also according to the terms of the Master Labor Contract the health insurance premiums have amounted to approxi

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mately 5 per cent of the worker s gross pay and have been shared equally by the employer (U S Armed Forces) and the employee

For all practical purposes most of the American installations have constituted a Japanese industry and therefore must abide by Japanese labor laws The employees have been entitled to all the benefits of the labor laws including Workmen s Compen sation Workmen s Health Insurance and those providing for extra hazardous pay allowances Another factor Mr Doyle con sidered was that there were no Japanese industrial hygiene engineers and only a few Japanese physicians with formal training in industrial medicine

In view of his findings Mr Doyle recommended that a mini mum industrial hygiene program be initiated in the Far East even though AFFE installations were in a sense temporary and the expenditure of funds to provide facilities comparable to installations in the U S could not be justified Acting up on these recommendations an industrial hygiene program was established by the U S Army in the Department of Chemistry 406th Medical General Laboratory near Tokyo Japan to render assistance to the Army Navy and Air Force installations in Japan Korea Okinawa and the Philippines Personnel as signed to this program included an industrial medical officer (Lieutenant Colonel Charles W Kraul MC USA) a Department of the Army civilian industrial hygiene engineer (the author) and several chemists as well as officers enlisted men and Japanese personnel Engineering field sampling equipment was procured and laboratory facilities were provided

In addition to this program the U S Air Force had a sanitary and industrial hygiene engineering officer assigned to the large Air Materiel Depot in Japan and two other sanitary and in dustrial hygiene engineering officers assigned to the 5th Epi demiological Flight the preventive medicine unit for the Far East Air Forces This unit was commanded by an Air Force Medical Corps colonel who had formal training and experience in the field of industrial medicine

Safety personnel either American military or civilian have had an important role in the health and safety of the industrial working population and have worked closely with the medical personnel

The program has been designed largely for the Japanese nationals employed by the U S Armed Forces but the program has been limited in scope for many reasons One major factor has been that the Japanese physicians at the Japanese dis pensaries located on each installation have not been directly responsible to the respective U S commanders Also the pri mary interest of the Japanese physician has been curative rather

than preventive medicine Therefore, the medical requirements of a complete program have been somewhat lacking

INDUSTRIAL ACTIVITIES IN THE ARMED SERVICES

The principal industrial operations in the Far Eastern installations of the U S military forces have been the rebuilding, repairing, and maintaining of vehicles, aircraft, buildings, and equipment used by the three services The maintenance activities at Air Force bases include many shops similar to those reported by Meyer[2] for Strategic Air Command bases These shops are electrical, electroplating, hydraulic, battery, jet engine overhaul and testing, jet engine test stands jet aircraft run up pads motorized and ground equipment repair and liquid oxygen plants In the field maintenance shops, a wide variety of chemicals are used including solvents Many of these may create health hazards for industrial workers unless good control measures are provided

Other industrial operations observed at air bases in the Far East include spray painting vapor degreasing doping and welding Inert gas (argon) welding on aluminum and stainless steel is done at most bases The primary hazard is the exposure to ozone but other arc welding health hazards may exist [3]

The largest industrial unit of the U S Navy Fleet Activity at Yokosuka Japan, is the Ship Repair Facility This unit is composed of 14 major shops including planning and design, ship fitting welding, sheet metal, gasoline and diesel engines, boiler making electric pipe, carpenter, paint spraying and docking shops This facility repairs naval vessel engine parts and overhauls engines The Public Works Department has a large dynamometer shop as well as paint spraying battery, and welding shops

The Army has several large ordnance depots whose industrial function is primarily the rebuilding of military vehicles The U S Army Signal Corps Quartermaster Corps, and Engineering Corps also have large depots The shops at these depots include chemical cleaning processes sandblasting, electroplating, welding, spray painting vapor degreasing dynamometer test shops, and others

In addition to these industrial shops throughout the Far East, the military services have hospitals and dispensaries whose medical and dental roentgenographic units may present a hazardous work environment [4] Other hazardous conditions commonly noted that may cause an occupational illness or reduced efficiency are inadequate lighting conditions and exposures to high temperatures and humidities

HEALTH HAZARDS AT FAR EAST BASES

Misuse or Nonuse of Respirators

The misuse or nonuse of the proper type of personal protective equipment particularly the respirator has resulted in fatalities, near fatalities and serious illnesses In addition it has been observed that the respirators are not always properly fitted to the worker s face

Gasoline storage tank cleaning On several occasions illnesses have occurred in connection with gasoline storage tanks

The health of workers who enter or clean inside gasoline storage tanks may be endangered by the exposure to atmospheres containing tetraethyl lead gasoline vapors and possibly a deficiency of oxygen This type of work can be made safe by the use of proper equipment

At one underground petroleum oil and lubricants (POL) terminal some workers were accidentally exposed to leaded gasoline vapors when they wore canister masks for organic vapors Canister masks are *not* suitable for this type of work Previously the tank had been flushed with sea water When making the repairs there was a continuous rush of air through the tank the force was sufficient to blow over a 5 gallon can The tunnel bay had been tested for gasoline vapors and was reported not to be in the explosive range A health hazard may still be present even though the vapors are not in the explosive limits A Japanese physician stated that the workers had symptoms of nervousness dizziness weakness of the arms nausea and anxiety Blood samples and 24 hour urine specimens were obtained from the four workers affected The work history symptoms and laboratory findings for one of the workers were compatible with a diagnosis of moderate poisoning due to tetraethyl lead In another case there had been exposure to lead but the diagnosis of tetraethyl lead poisoning was neither established nor justified from the evidence at hand The other two workers did not have a severe exposure

Another worker equipped with an ordinary military gas mask and carrying an all purpose canister entered a deep concrete lined open pit that contained gasoline and its sludge This pit where the control valves were located was between two subterranean gasoline tanks After the worker had carried two or three buckets of the pit contents to the surface he gave an indication of being very ill and nearly unconscious He was first taken to a local dispensary and later to a nearby hospital He lost two days time from work No clinical data were received from the Japanese dispensary or hospital

About a week later at the same depot two more workers wearing the same type of mask had similar experiences after entering a subterranean gasoline storage tank This tank had about three inches of gasoline and sludge on the bottom



Figure 1 Oxygen deficiency in manhole of an underground drainage system

Following these incidents industrial hygiene personnel made recommendations for proper control measures including personal protective equipment that would make the work environments safe After these occurrences a request to approve special hazardous pay allowances for all Japanese POL workers at the American military installations was received The request was not approved in view of recommendations made by the industrial hygienists This resulted in an estimated annual savings of $250 000 to the U S Armed Forces for hazardous pay allowances

Oxygen deficiency exposure Three Japanese farmers died and one Air Force medical corpsman fainted after descending into a manhole (fig 1) This manhole located in an American dependent housing area was part of an underground drainage system that ran from a lake adjacent to and outside of the dependent housing area to the local farms on the other side of the housing area The manhole, approximately 4 feet in diameter and 15 feet deep was made of corrugated sheet metal and was supported by concrete fill It was covered with a concrete lid

Before this incident it had not been entered for a period of over one year A 67 year old farmer descended into the man hole immediately became unconscious had convulsions and died at the bottom of the manhole within minutes His son age 48, went into the manhole and died in the same manner Another son age 47 decided to enter the manhole but before descending he obtained an all purpose canister type gas mask from the local air base fire station and tied a rope about himself Upon arrival at the bottom of the manhole he also became unconscious He was pulled to the surface and placed in an ambulance but was dead upon arrival at the local dispensary The medical corpsman decided he would enter the manhole but would hold his breath and also wear the same mask Upon reaching the bottom he slipped forgot to hold his breath and immediately fainted He was pulled to the surface with a rope and immedi ately thereafter had epileptiform convulsions

A week later vapor tests were made with a combustible gas indicator These tests all gave negative findings Six air samples were collected from the bottom of the manhole with a suction pump air sampling flasks and long sampling tube Laboratory analyses revealed that the oxygen content was about 2 per cent and carbon dioxide concentration was 11 per cent These analyses were augmented by a complete infrared gas analysis of the air samples but no detectable amounts of trace con taminants were found The history of the accident the clinical signs and symptoms exhibited by the victims and airman the mode of death and the laboratory findings were all consistent with the diagnosis of fulminating anoxia

Solvent Hazards

Carbon tetrachloride Mr Doyle reported in his survey find ings that the largest single potential health hazard was the widespread use of carbon tetrachloride For all practical pur poses this solvent is no longer used in the Far East except as a fire extinguishing agent and in a few rare work environ ments where its use is essential As a matter of fact other solvents are now even preferred for many of the jobs for which carbon tetrachloride was formerly thought to be essential

The relatively rare use of carbon tetrachloride has been brought about largely through close liaison between industrial hygienists and supply personnel continual educational programs and certain restrictions placed on the use of the solvent by medical military regulations In the Air Force the base surgeon must approve the use of certain toxic chemicals such as carbon tetrachloride

Although the exposure to carbon tetrachloride from industrial operations has been almost eliminated there have been a few incidents of exposure and one known death attributed to in halation of its vapors The latter occurred in Korea in 1957 when an officer used the solvent to clean up soot in his quarters after

a stove cleaning job His exposure was estimated to be at mt 30 to 35 minutes He died in an Army hospital a few days later Two other persons had approximately the same exposure but did not die

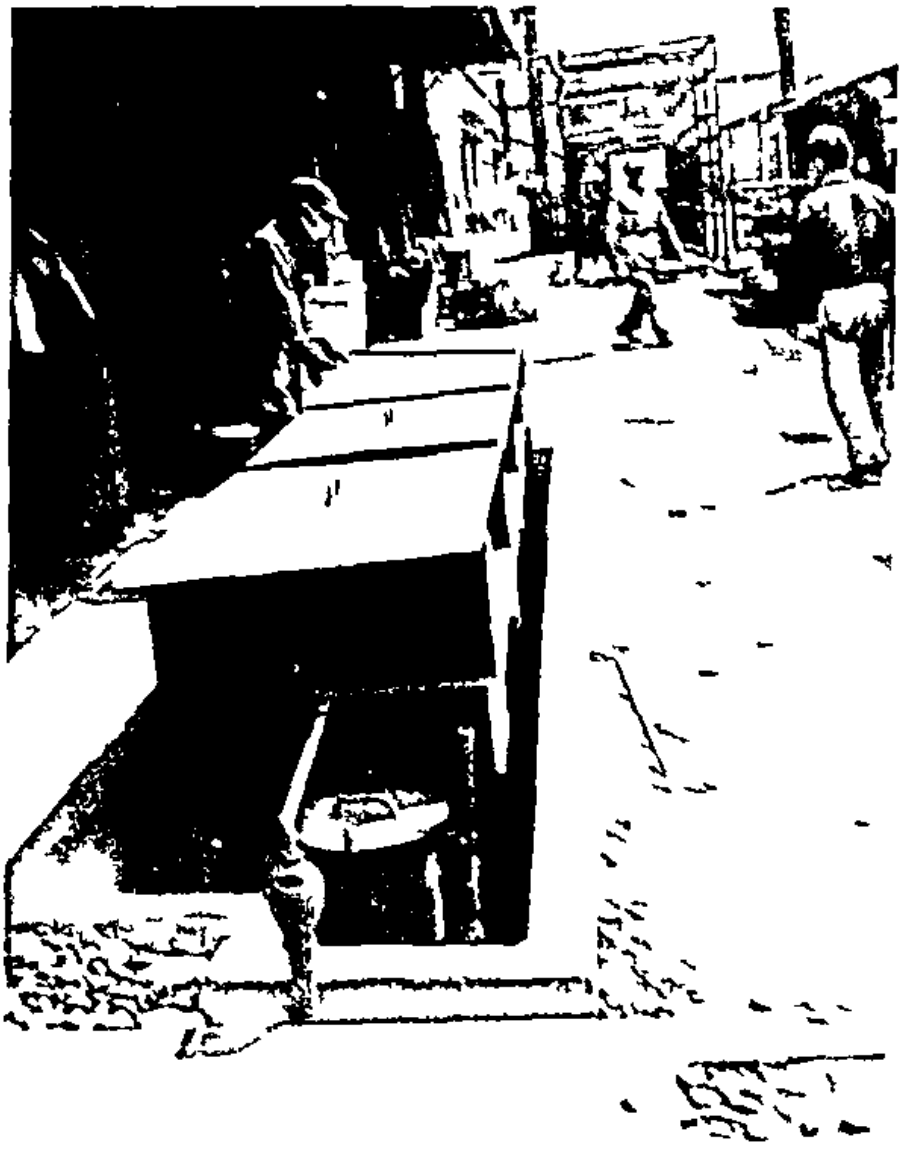
Personnel of one military installation fire department were briefly exposed to an estimated concentration of 7500 ppm when they entered an unventilated room in which more than two gallons of carbon tetrachloride had leaked from a metal container over a weekend This incident did not prove to be serious,

Trichloroethylene This solvent is now probably used more extensively than carbon tetrachloride was prior to 1955 An excellent technical bulletin[4] was published by the Army in 1955 on the operation of vapor degreasers using trichloroethylene It has been an important source of data for the hazards involved, proper operating instructions, and control measures

At one depot, vapor degreasing was done outdoors in a home made tank heated by steam The tank consisted of three 55 gallon drums that were welded end to end with the axis in a horizontal direction No engineering control measures had been provided Air pollution was detectable 15 to 20 feet away This tank was replaced by another one (fig 2) fabricated locally It was provided with a water condenser to prevent the vapors from leaving the tank, with a "sight funnel" to facilitate temperature measurement of the water effluent, and with tank covers These measures adequately controlled the exposures

It was observed at one installation that a vapor degreaser (fig 3) had been provided unnecessarily with an overhead, hooded, mechanical exhaust ventilating system that actually increased the health hazard by exhausting the vapors up through the workers' breathing zone Another vapor degreaser was greatly affected by drafts over the tank from a nearby window during the summer months As is known, such drafts should not have a velocity greater than 50 feet per minute especially when directed lengthwise [5]

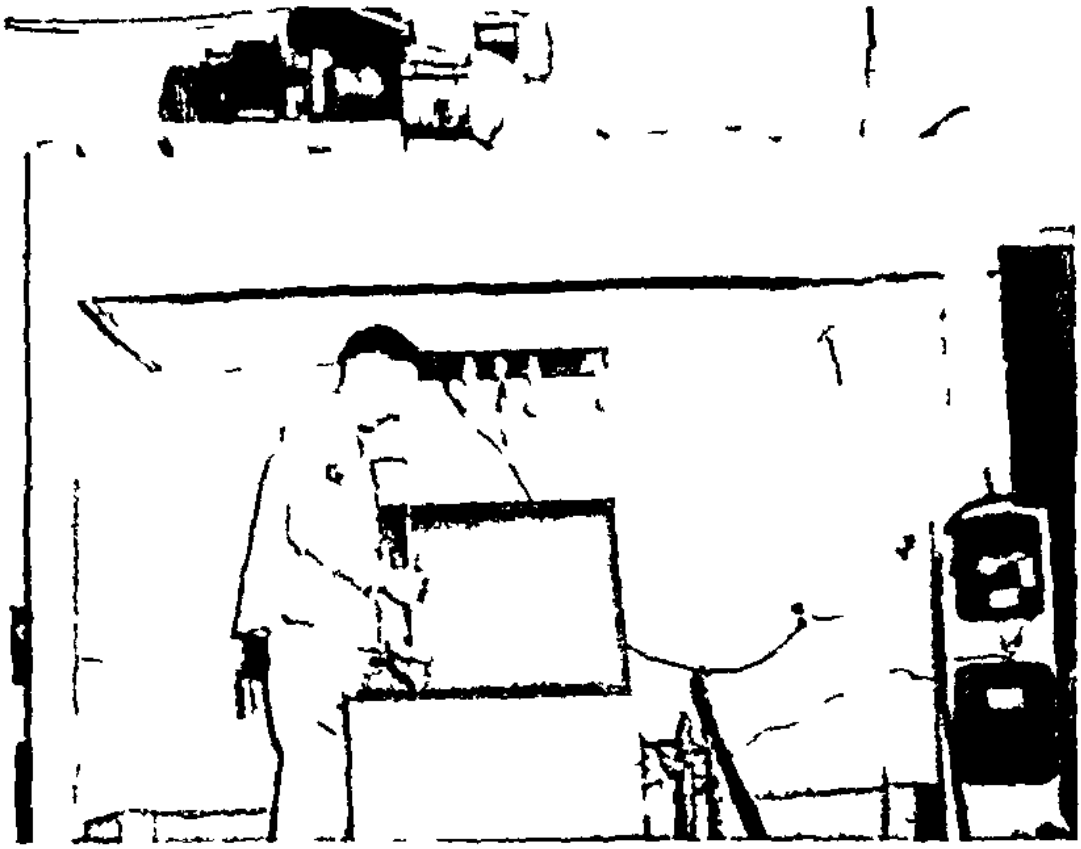
Another hazard associated with the vap
and noted in the Far East is the cleaning
lated inside the vapor degreaser tank wit
equipment, namely the air supplied respir
do not provide adequate protection Even
cleaned there still may be high concent
vapors in the tank or an oxygen deficien
unusual incident, four workers had used
equipment while cleaning a trichloroeth
tank Upon completion of the cleaning
down inside the tank without wearing
the job He immediately became unco
by two other workers, neither of whom
worker immediately became unco
to the surface and all three comple
dent could have been fatal



F g 2 \ p d g t ll d t d a d p t b ld g

In addition to vapor de_reasing with trichloroeth\lene there has been a widespread use of the solvent in the cold state, at room temperature This may be hazardous when workers are exposed to the solvent vapors or have skin contact with the solvent

Other solvents Solvents such as the petroleum distillate Stoddard (commonly known in the military services as P S 661) kerosene and diesel oil have been widely used In some instances workers have been exposed to aerosol mists from spraying operations or when blowing off excess solvent from degreased parts with compressed air These conditions have made it necessary to provide mechanical exhaust ventilating systems with hoods Canopy hoods (fig 4) are not considered the proper type These do not control the worker s exposure to the aerosol mists of the solvent when excess solvent is blown off with compressed air The lateral exhaust hood is more desirable In addition to



Figu e 3 Vapo deg eas r u ith canopy hood exhaust system



Figu e 4 Canopy hood u ith mechan cal exhaust ve tilation.

the inhalation hazard several cases of dermatitis have been noted from the use of these solvents It was reported that in one shop employing 200 workers where diesel oil was used extensively for cleaning machinery parts, over 50 per cent of the workers at one time had dermatitis

Carbon monoxide and other exhaust gases At one installation an attempt had been made to discharge the exhaust gases from an internal combustion engine by gravity flow through an exhaust extension pipe The small pipe from the engine was inserted into a pipe of larger diameter without providing a tight connection or seal This opening allowed some of the exhaust gases to escape into the work shop

In another similar shop a control measure in the form of a mechanical exhaust ventilator had been installed This was presumed to be satisfactory The control was a manifold arrangement for the exhaust pipe extensions with an exhaust fan in the system At all engine areas with the exception of the area near number three engine with a total of 16 engines running simultaneously the carbon monoxide (CO) concentration was well below the threshold limit value (TLV) of 100 parts per million (ppm) adopted by the American Conference of Governmental Industrial Hygienists for a daily eight hour exposure The CO concentration in the immediate vicinity of number three engine was about 200 ppm Further investigation revealed that the discharge end of the exhaust system was located just outside the building near number three engine about 10 feet above ground level This condition permitted some of the exhaust gases to re enter the building through the window nearby By merely extending the discharge end of the stack above the building, the hazardous condition was readily corrected

At another shop that was a dynamometer testing operation, exhaust gases were discharged by gravity flow up through a tall stack Inside the shop however the exhaust extensions from some of the engines were not tightly fitted Tests made near one engine revealed a CO concentration of 1 000 ppm After the cause had been eliminated further tests showed the CO concentration to be well below the TLV level

A near fatality occurred at an air base when a pilot resting in unventilated crew quarters was poisoned by carbon monoxide The CO source was traced to a gasoline operated Herman Nelson heater being used to heat the quarters The heater was located outdoors but the heated air conveyed through a flexible canvas duct into the room had become contaminated from the exhaust gases These heaters were not intended for use in confined unventilated areas but for large areas such as hangars or tents where there would be sufficient natural ventilation to control a carbon monoxide hazard

Non occupational carbon monoxide poisoning incidents in Japan similar to those reported in U S communities have

resulted from the use of faulty domestic gas appliances in private dwellings that are owned by Japanese and occupied by U S military personnel These appliances use bottled gases such as propane, illuminating gas, or other types of fuels such as charcoal for the small Japanese heaters called "hibachies" Hot water heaters using gaseous fuels have been particularly dangerous unless the heaters have been properly vented to the outside atmosphere

On Easter Sunday, 21 April 1957 between 0500 and 0800 hours, Mrs F and four of her children (a boy, 5 years of age, and three girls, 3 8 and 10 years of age) were in the kitchen and adjacent living room In this period it was estimated that the hot water heater, burning propane gas, was used for about 25 minutes to heat water for washing dishes, showers, and for the washing machine At about 0800 hours, Mrs F called to her husband, who was asleep in a bedroom some distance from the kitchen, informing him that something was wrong" with the children Mrs F felt dizzy and lightheaded and the children were unconscious Captain F immediately rushed the family to the hospital The 10 year old girl remained in the hospital and was released the next day The other children were released after examination The 8-year old girl complained of a severe headache after she came home from the hospital She was taken back to the hospital but was again released and returned home The boy complained of a headache late Sunday afternoon The 3 year old girl vomited when she was carried out to the car and vomited again on the way home from the hospital Fortunately, all members of the family recovered

A study was made of the environment on 25 April Tests for carbon monoxide were made with a squeeze bulb type CO detector near the sink area of the kitchen, after the hot water heater had been turned on for about five minutes The CO concentration was nearly 1 000 ppm It was observed that the heater had been improperly vented to the outside atmosphere The initial diameter of the exhaust pipe was about six inches however, it was reduced to about two inches before going through the outside wall This condition apparently created a back pressure and forced the exhaust gases into the kitchen environment Recommendations were made at the time to have the exhaust pipe diameter six inches throughout its length and to install a small wall exhaust fan in the kitchen After the exhaust pipe had been corrected tests for carbon monoxide were all negative

Other Exposure Hazards

Noise hazards Exposures to hazardous noise levels, particularly from jet aircraft, have been of concern to the U S Air Force the past few years Many studies on this problem have been conducted at Wright Patterson Air Force Base, Ohio, and at other bases in the U S Recently, the Air Force published a regulation[10] to be used as a practical guide for controlling exposures to aircraft and other hazardous noise sources

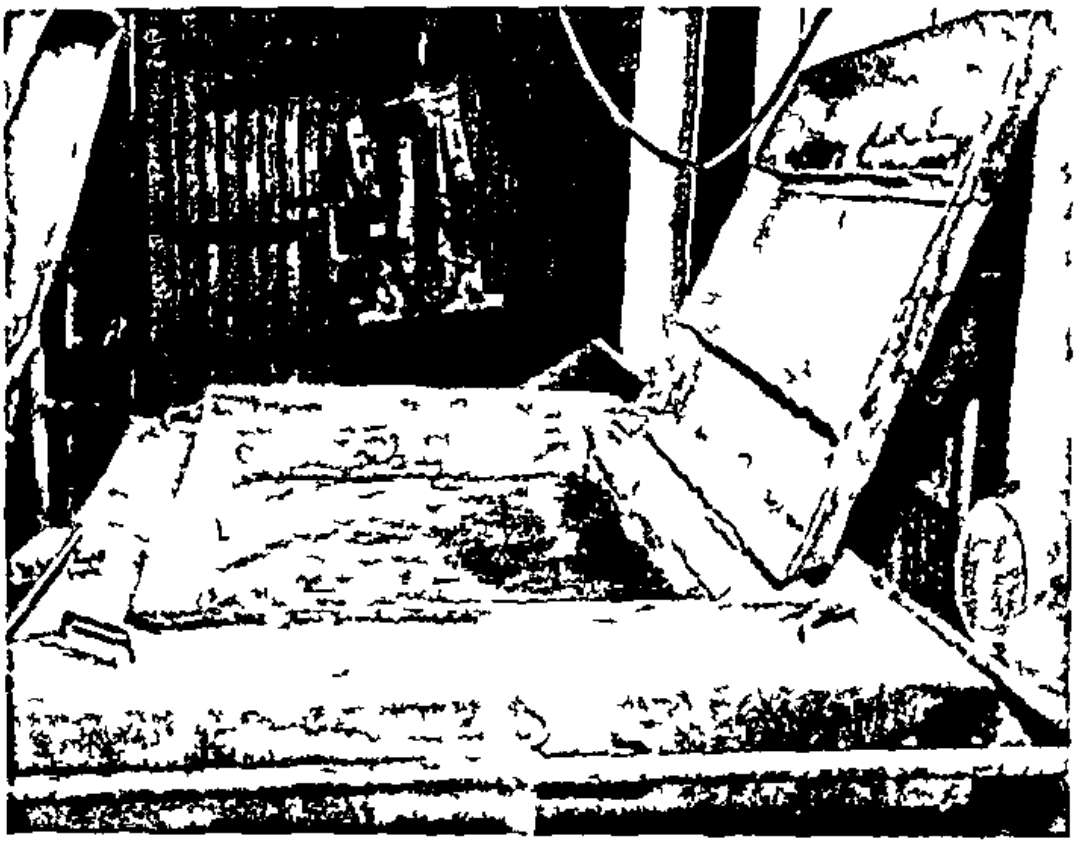


Fig 5 Vehicle radiator immersed in molten lead

This regulation gives instructions for designating hazardous noise exposures and work environments hazardous noise exposure criteria degree of protection afforded by personal protective devices criteria for determining hearing loss of individuals and instructions and criteria for assigning reassigning, and providing medical treatment for individuals with specified hearing loss This regulation has been very useful to flight surgeons and industrial hygienists who have been actively engaged in a hearing conservation program in the Far East including indoctrinating personnel in the undesirable effects of noise issuing personal protective devices such as ear plugs and ear muffs or helmets making noise surveys and periodic monitoring audiometry

Lead exposure Lead has been used at several installations the common use has been as a soldering agent At one depot vehicle radiators were immersed in a large tank of molten lead to seal leaks (fig 5) After the radiators were allowed to drain the excess lead was removed by an air hose A canopy hood (fig 6) with mechanical exhaust ventilation was provided for this operation It should be pointed out that this type of hood is not considered a satisfactory control measure where the air contaminants are exhausted up and through the breathing zone of the worker (fig 7) Studies made with an electrostatic precipitator revealed that the exposures were considerably above the TLV for lead for a daily eight hour exposure Although the

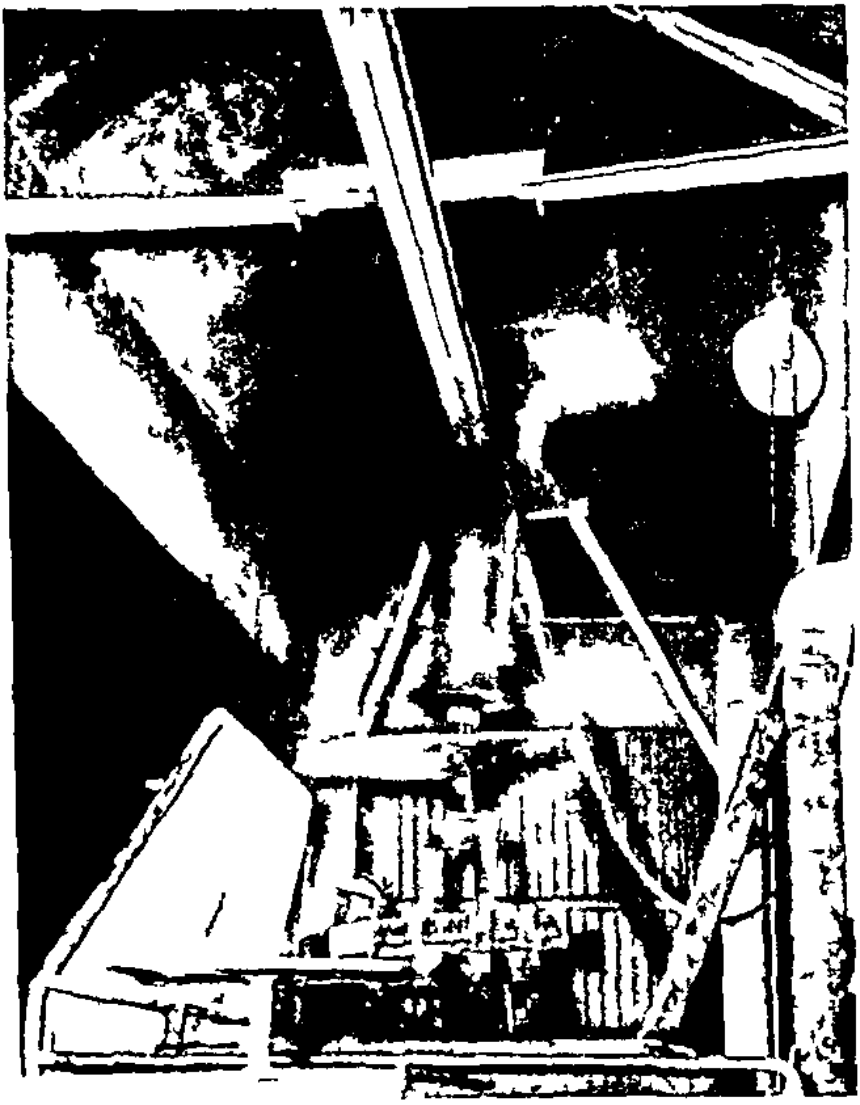


Figure 6. Canopy hood with mechanical exhaust system ove molt n lead d p tank shoun in figure 5

work was not performed every day nor usually even for a full day, it was considered advisable to modify the exhaust system to that of a lateral exhaust system (fig 8) Tests and measure ments made after the ventilation system was modified revealed that the hood more than adequately controlled this lead hazard Very little new material was required to modify the hood effec tively

Ionizing radiation exposure Several exposures to ionizing radiation have been noted At one depot, two workers were en gaged *in the inspecting testing, and renovating of used and* sometimes broken luminous markers containing radium sulphate, a radioactive substance There were two types of hazards in volved (1) an external hazard from exposure to gamma rays, and (2) an internal hazard from inhalation of radioactive radon gas and possible ingestion or skin contact with the radioactive substance



F g 7 V t lat g y t m xh st g l d f m



F gur 8 Ca py hood plac d by l t l xha t hood that ad quat ly t ll d worker xp to l d f me

For an individual marker, the external hazard would not be significant but as several thousand markers (up to 10,000) were stored in open boxes inside an isolated warehouse, the external hazard was significant to workers inside the building Measurements, made with a RADIAC set roentgen meter, indicated a worker would receive in less than four hours exposure time the maximum *weekly* permissible dose adopted by the National Committee on Radiation Protection A closely supervised individual monitoring program was initiated using the self reading pocket dosimeters (0-200 mr) to determine when an individual worker was approaching his maximum permissible weekly dose The internal hazard could not be evaluated as suitable sampling apparatus was not available

A worker in an optical repair shop at another depot had found a few of these luminous markers He used them as a source of luminous material for touch up work on clock dials and hands but was unaware of the potential radiation hazards No exhaust ventilation was provided for this shop

In a routine survey of a dental clinic, it was observed that a leaded screen had not been provided to protect the technician from exposure to the primary beam and to scatter radiation The technician and his assistant, each wearing a pocket dosimeter, were monitored for their radiation exposure One day's exposure was over one third of the maximum permissible weekly dose A protective screen was provided later

SUMMARY

The incidents presented are a few of the highlights of the industrial hygiene program in the Far East The circumstances under which potential health hazards operate to produce deleterious effects on health of workers are legion The only safeguards are proper design of shops, properly designed ventilating systems, proper operating procedures, and an awareness by the workers, supervisors, and maintenance personnel of the potential hazards This can be accomplished only by continuous education of all persons concerned

REFERENCES

1 D yl H ry N *Indust ial Hygiene Survey of Army Forc s Far East Installat ons* Official Report of D p rtm t of H lth Ed c t d W lf re 14 Jun 1954 (U p bl hed r port)

2 M yer A F J O p t o l h lth progr m of Strat gi A r C mm d *A M A Arch Indus he lth* 14 107 113 A g 1956

3 Schr k H H N w w ldi g t h q e req ire re- n e t g tio of p sibl ew r diff r t h lth h ards *Indus & Eng n. Chem.* 47 103A 105A Apr 1955

4 *Medical X Ray Prot ct on.* D p rtm nt f Air F rc M n l 160-10 Departm t f Army T ch l B ll t M d 62 7 M y 1957

5 *Cl an ng Pet leum Storage Tanks* Acc d t Pr ntio M ual l B 2d d t o Am r c P tr le m I st tut New Y rk N Y Oct 1950

6 V *por Degreasing Equipment Operation and Maintenanc* Dep rtm t of Army T hnic l B ll t Ord anc 584 5 Ap il 1955

7 P rry F A. (edit r) *Indust ial Hygiene and Toxicology* I t c nc P bli h rs N w Y rk N Y 1952 Vol 2 pp 1094 1098

8 Th h ld l m t l f 1957 d p d 19th An ual M t g Am C n-
f f G m l I d l Hyg St L Ap 20-23 1957 *A M A*
Ar h Indus H lth 16 261 265 Sep 1957
9 T h J B d H lp M A d l b m d p ing d
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10 *H ard us N is E posur* D p tm t f At F R g l 1703 29 O b
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IN DEFENSE OF COMIC BOOKS AND TV

Despite the d sparaging attitude of m ny ed c tors toward the ubiquitou comic books and the commerc al television set the facts are that for b tter or worse these have become n truments of educat on The story i told of two third grade boys at recess who w e describing with con d able accuracy the automotive world about them Look ng kyw rd they a sess d the type and c pabilities of a jet bomber flying ove he d Then with equal facility they debated the potenti ls of a new model c r wh h had und rgone rec nt ngine mod fications Their further comm t we e interrupted by the ri ging of the school bell and one of the l ds was h ard to say Aw heck! Guess w v g t t go n and t g me mor of those darned bead Th f ct of ext cur icular ed c t on w brought home to m ather force fully o e ning by the erudite comment f my 10 y ar old son after we had listened to an hour discourse by Dr Hub tu Strugh ld on the possibility of life on other pl n t dir cted primarily toward the college tudent Despite the evident nterest of my on in the ubject matter I wa convinced th t he spent the hour flound ing f r beyond his intellectual depth On the way home n th c ndesce ding manner of a parent I was attempting to lv ge the pp rently wasted even ng a d had reached the matter of the silicon atom when my son interrupted to inform me that he was f miliar with the essential requirements of terrestrial life and that the characteristics of the silicon man were well known to him A surprised father then listened to a second and equally factual lecture on the p oblems of life in spac The ource of this information was the comic book and the telev n It w s difficult on this pa ticular occ sion to t c ze m di of commun c t ons th t had plac d a f fth g d ude t in a frame of mind capable of intell ge t p rt c p t o n p e entation for adults by a world au tho ty p c med c ne —Melvin A C sberg Kn wl edge Come But W d m Lingers *The Jo rnal of Med cal Ed cat on* S p mb 1958

PLEURAL BIOPSY AS A DIAGNOSTIC METHOD

FRANKLIN MITCHELL *Captain MC USA*
MICHAEL FERRELL *Captain MC USA*
THEODORE BACHARACH *Lieutenant Colonel MC USA*
ELMORE M ARONSTAM *Lieutenant Colonel MC USA*

THE importance of a definitive diagnosis in a patient with pleurisy and effusion is unquestionable, if such a patient is to be treated intelligently Well documented clinical studies indicate that a majority of previously healthy patients with idiopathic pleurisy and effusion eventually will develop some form of tuberculosis within five years Sixty five per cent of such persons among military personnel in one series developed tuberculosis [1] The findings in general population studies vary from 16 to 50 per cent It has been estimated that 90 per cent of idiopathic pleural effusions are tuberculous in origin [2] Skaggs and Smiley[3] reported 50 patients treated for an average of 200 to 370 days with bed rest following an episode of pleural effusion within 6 years they suffered a 10 per cent mortality from disseminated tuberculosis Idiopathic pleural effusion is not a benign condition Specific and adequate therapy should be mandatory It is not desirable, however to treat patients showing the signs and symptoms only without a positive diagnosis It would be most gratifying to establish a specific diagnosis and thereby institute the necessary prolonged tuberculosis therapy only in proven tuberculous cases A method of excluding tuberculosis as the etiologic agent in a given case of pleurisy and effusion would be equally desirable

As the medical and surgical chest disease center for the United States Army in Europe this hospital frequently is faced with the problem of diagnosis treatment, and disposition of patients presenting with pleurisy and effusion We have been interested in the optimistic reports which have appeared in the recent literature advocating surgical pleural biopsy as an aid in the diagnosis of pleural effusions [4-6]

CASE STUDY MATERIAL

Twenty five patients admitted with pleurisy and effusion were studied carefully and then offered pleural biopsy as a possible means of expediting diagnosis and treatment On admission

From 98th General Hospital APO 34 New York N Y

complete medical evaluations including the usual roentgenograms thoracentesis (when possible) skin tests routine blood cell counts urinalysis and culture of pleural fluid sputum and gastric washings were carried out Agglutination titers blood chemistry studies L E cell preparations and bronchoscopy were performed when they were thought to be of diagnostic value When evidence of generalized illness abated a pleural biopsy was performed No patient with a lung parenchymal lesion or with a proven diagnosis was operated upon The patients ranged in age from 17 47 years with an average of 26 years Twenty one were Caucasian and four were Negro The onset of symptoms before biopsy was three weeks to four months with an average of two months At the time of admission only 12 of the 25 patients had residual pleural fluid sufficient for successful thoracentesis Pleural fluid examination revealed four specimens with predominant neutrophils one with 72 per cent eosinophils and the remainder demonstrated predominant lymphocytes

All patients had positive reactions to intradermal tuberculin tests with PPD except one and this one exception converted to positive two months later The sedimentation rates varied from 4 to 55 mm per hour with no relation to clinical condition or operative findings

METHOD

Surgical biopsy was performed under general endotracheal anesthesia In the first 15 patients a 12 to 15 cm intercostal incision was made over the area of x ray density Generally a 2 by 4 cm biopsy specimen of pleura was obtained Later in the study it was thought that a larger incision with complete exploration of the chest cavity would be more revealing Incisions in the last 10 patients therefore were larger than 15 cm and sufficient to adequately explore the entire pleural cavity In two patients decortication was carried out at the time of the biopsy procedure

RESULTS

Acid fast bacilli were isolated by smear or culture in only 8 of the 25 patients operated upon (table 1) Thirteen patients demonstrated pathologic changes usually associated with tuberculosis Fibrosis epithelioid cells and giant cells were noted in inconstant relative amounts Caseation was found in four patients Acid fast bacilli were seen on smears on four occasions two of which failed to grow on culture

Fibrous tissue and chronic inflammatory cells were the predominant findings in those 10 biopsy specimens which we have labeled nonspecific Two of these pathologic patterns grew out acid fast bacilli on culture and are included in the definitely diagnostic group above

Six patients received streptomycin sulfate or isoniazid para aminosalicylic acid before admission to our hospital Culture

of biopsy material in two of these demonstrated acid fast bacilli as well as the typical findings of tuberculosis on microscopic sections The pathologic findings in the remaining four were comparable to the "nonspecific" untreated cases

TABLE 1. *Results of b opsy performed in 25 patients u th pleural effusion*

Findings	Number	Per cent
Positive di gnostic biopsy	8	32
Su„gestive tuberculosis by microscopic section (No *Mycobacterium tuberculosis* seen or cul tured)	7	28
Nonspecific biopsy	10	40

Two of th ca had n p c f c pathol gic changes but pos t v ultur f t ss

Of interest is one patient who, though found to have a "non specific" specimen, eventually had a positive acid fast bacilli culture from pleural fluid taken prior to surgical biopsy Another patient with a negative pleural biopsy, developed tuberculosis of the bone at another hospital, six months later One patient who converted from a negative to a positive PPD skin test during hospitalization had a nonspecific biopsy

The larger incision, with exploration of the entire pleural cavity, produced no improvement in our diagnostic results

DISCUSSION

It is apparent that in only 32 per cent of the patients was firm diagnosis of tuberculosis obtained by pleural biopsy Additionally, in 28 per cent of the patients (exclusive of the definitely diag nostic group) a "typical" pathologic picture of tuberculosis was seen under the microscope, but stains and cultures for acid fast bacilli were negative Hence, if we are permitted to include the latter two categories, pleural biopsy gave only a 60 per cent positive or highly suggestive indication that tuberculosis was the cause of the pleurisy and effusion No other cause was found in any case Disappointing to us was the fact that definitely two, and probably three, of the 10 "nonspecific" biopsies subse quently demonstrated evidence of tuberculosis as the cause of the pleural effusion

Medical follow up of patients with negative biopsies over five years would indeed be important information All patients with negative biopsies in this series, with one exception, have been started on an ambulatory course of anti tuberculosis medic

Of necessity, our patients are in a younger age group [illegible] we cannot evaluate pleural biopsy in those over [illegible] But in view of past clinical experience, we [illegible] negative pleural biopsies prove that the [illegible] the *Myco tuberculosis* We believe that [illegible] in pleural biopsy over a presumptive d[illegible]

in patients under 40 years of age with an idiopathic pleural effusion It would seem wise to reserve surgical pleural biopsy for those patients with a negative tuberculin test or in whom there is good reason to suspect some etiologic agent other than tuberculosis Pleural biopsy has indeed been disappointing in our hands as a means of ruling out tuberculosis

SUMMARY

Clinical experience in the early pleural biopsies in 25 patients with idiopathic pleural effusions led to a bacteriologic diagnosis of tuberculosis in 8 Granulomatous changes suggestive of tuberculosis were found in 7 In 10 patients the findings were nonspecific Of the 10 with negative biopsies the subsequent course indicated tuberculosis as the etiologic agent in 3

Pleural biopsy as a diagnostic aid in excluding tuberculosis has been disappointing in our hands and it is suggested that it be reserved for those patients with persistently negative tuberculin reactions and for those cases in which a cause other than tuberculosis is considered

REFERENCES

1 R p W H d W g J J P m y f b pl ural ff in mil t ry p l *Am. Rev Tuber* 71 616-634 M y 1955
2 Sk gg J T d Sm l y G W C ur f d p h pl ural ff 50 p *Am. R Tuber* 72 647 652 N 1955
3 St d W E h h l A. d S H K Op d p h l g l f ding 24 p w h y d m f d p h pl ur y w h ff io p m bly t b r- l *Am. R Tuber* 71 473-502 Ap 1955
4 D F N Kl k E d Alb E N dl b p y f p n t l pl ur (M d l I t ll g t) *New England J Med.* 252 948-949 Jun 2 1955
5 B g P F k l E P Sh C. B J Ca T N Pl uri y w th ff d t m m d ff l d g f d p h pl ur l ff *U S Armed For M J* 8 31 45 J 1957
6 D h R F K S M tth w M J Pl ur l b p y d l g diag f pl ur l ff w f l t d p rt f 132 b p *Ann. Int M d.* 48 344 362 F b 1958

NOT THE PILL BUT THE MANNER

Reason nd c mmon sense dictate that som thing b done to curb the exc ssiv use of tranquilizers The idea of a compl tely t anquilized society is an awesome one We know of instances wh e driv rs and even pilots were g ven the drugs Notw th t nd g the r potent nd some t mes da gerous m nt l and phys cal effect givi g a pill t a p t nt c n b poor medical pr ctice when t is given a ubst tut for the physician s time and person l assist a c W all l ke to rel v our p tient symptoms but tr t g th moke ver puts o t the fire There c n never be a s b t tute fo sympathetic pproach and a s cere int re t in th p t t The cur ncy of p tient doctor rela tionship n t th p ll but th manner —Pseudo Panace *USAFE Su g on C mm nt* O tober November 1958

TOPICAL OCULAR THERAPY

WILLIAM S TASSMAN *Captain USAF (MC)*

AT the present time we have several antibiotic and chemotherapeutic drugs available for topical ocular therapy, with the result that the choice of the proper agent is not a simple one Rational use of bacteriostatic drugs presupposes an accurate diagnosis Conjunctival infection is closely simulated by allergy, acute glaucoma, and iritis These noninfectious entities do not of course benefit from antibiotics

Response to the proper topical antibiotic is expected in acute bacterial conjunctivitis, bacterial corneal ulcer, marginal blepharitis, and hordeolum Acute bacterial conjunctivitis is the commonest eye condition treated with antibiotics and responds well to them Therefore, if a conjunctival injection fails to subside within two days of adequate therapy, the probability of misdiagnosis is great

Adequate therapy is most important The drug chosen should be applied in adequate concentration and with enough frequency to achieve the desired healing effect A very common mistake is the homeopathic prescription of one drop to be instilled three times a day For full effect drops should be instilled at hourly intervals or even more often

Ointment vehicles may be used for night instillation The resulting blurred vision and greasy lids make drops preferable during the day The latter are easier to instill in struggling children and are more efficacious because ointments may delay ocular healing [1] This is important where the corneal epithelium has been denuded Ointments with or without antibiotics, will slow re epithelization

Once the infection has subsided it is important to maintain therapy for at least th ee days after the conjunctiva has become white During this period the frequency of administration may be decreased to three or four instillations a day Failure to follow such a regimen may result in a second flare up The eye may appear quiet clinically but the infection may only have been suppressed and not eradicated

In the common minor infections of the eye, cultures, scrapings, and stains are neither necessary nor economically feasible Should difficulty be encountered in differentiating allergic and

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bacterial conjunctivitis microscopic examination of a stained smear is most helpful The expense of sensitivity studies is clearly warranted in cases of corneal or intraocular infection orbital cellulitis and chronic infections resistant to previous therapy In serious infections, treatment must be started before culture results are available Here a gram stain may help in the initial choice of an antibiotic

TOPICAL AGENTS

Of the topical antibiotic and chemotherapeutic agents available, bacitracin sulfacetamide sodium neomycin polymyxin and chloramphenicol have been found to be highly effective Bacitracin primarily inhibits the growth of many gram positive bacteria It is also effective against certain gram negative cocci including the gonococcus It is of no value in fungus infections Similarly sulfacetamide sodium has a greater antibacterial activity against gram positive cocci than against gram negative bacilli although it too is considerably effective against gonococci Neomycin exhibits a broader spectrum of antibacterial activity than either bacitracin or sulfacetamide It is effective against a variety of gram positive and gram negative microorganisms against acid fast bacilli and actinomycetes In contrast the spectrum for polymyxin is restricted to gram negative bacteria including however pseudomonas Of all the drugs mentioned chloramphenicol possesses the widest spectrum of all Included are streptococci staphylococci and many gram negative bacteria

All but chloramphenicol derive their effectiveness from infrequent systemic usage If resistant mutants develop future serious disease caused by these strains will still respond to the more commonly used antibiotics The index of drug allergy is low for these medications Sensitization is less disadvantageous to the patient than is the intolerance to systemically used antibiotics such as penicillin where the 5 per cent incidence of local allergy is a strong deterrent to its use

Chloramphenicol the last of the drugs listed is also highly satisfactory In addition to being able to overcome most staphylococci it has the ability to penetrate the cornea readily This increases its value in various forms of keratitis and intraocular infections The studies of Swan and White are of interest in this regard The physical properties of the vehicles in which a drug is administered *i e* whether they are predominantly fat solvent or water solvent determine the ease with which the drug will enter the eye through the cornea Compounds in water are retained in their respective vehicles and therefore enter the cornea slowly Substances that are fat soluble penetrate the intact corneal epithelium more readily Chloramphenicol falls into this latter group and hence has a high degree of penetrability

Other drugs much used in topical ocular therapy are those constituting the group of local anesthetics The ill effects that follow their usage are many Foremost is the inhibition of corneal re epithelization after topical application Two processes are involved in the healing of the corneal epithelium (1) cell migration to cover the injured area and (2) mitosis to reconstitute the normal number of epithelial cells The migratory activity occurs first and is followed shortly afterward by cell division Buschke, Friedenwald, and Fleishmann[5] first found that topical anesthetics had a deleterious effect on mitosis This thesis has since been confirmed [6 7] An additional hazard is the development of subepithelial corneal infiltrates This occurs when pontocaine or an allied agent is used to alleviate the symptoms of a conjunctivitis

As a result, this group of drugs, the most commonly used of which is Pontocaine Hydrochloride (brand of tetracaine hydrochloride) is contraindicated in corneal abrasions, corneal ulcers, keratitis, and after removal of a corneal foreign body The physician is entitled to use a topical anesthetic only while working on the eye itself, that is, while removing a foreign body Subsequent to the initial management, however, ocular discomfort should be controlled by the systemic administration of analgesics such as codeine and Demerol Hydrochloride (brand of meperidine hydrochloride)

Prophylactic use of antibiotics after minor eye injuries will significantly reduce the incidence of serious infection When deprived of its epithelium, the cornea is most susceptible to bacterial invasion As routine practice therefore, antibiotics should be prescribed until the epithelial defect has healed A tight eye patch helps to insure the process This contrasts with conjunctivitis where patching is contraindicated When infection is present, patching creates a culture medium in which bacteria multiply rapidly

It also is important to dilate the pupil when the cornea is irritated Irritation causes pupillary constriction The pathway for this reflex is the ophthalmic branch of the fifth cranial nerve to the Casserian ganglion and the fifth nucleus Connecting fibers finally run to the sphincter by way of the posterior longitudinal bundle Local reflex dilatation of the iris capillaries through an axon reflex also contributes to constriction These vasodilator impulses, carried in the fifth nerve, have been designated as antidromic because they travel in an opposite direction from those the nerve usually carries The use of anticholinergic drugs such as homatropine hydrobromide, 2 per cent solution, or scopolamine hydrobromide, 0 2 per cent solution, is effective in eliminating pupillary constriction

Finally, some of the dangers associated with the use of steroid hormones in the eye must be considered Topical steroid therapy has been employed for vernal, allergic, chemical, and even bac

terial conjunctivitis when combined with the proper antibiotics This therapy also can in certain specific instances be used in this manner for corneal disease Unfortunately, many corneal diseases do not respond favorably to steroid hormones The use of steroids in such conditions as corneal abrasion corneal ulcer, epidemic keratoconjunctivitis, fungus infection and herpes simplex keratitis aggravates the disease process

Similarly the innumerable combinations of antibiotics with cortisone or hydrocortisone are contraindicated in the afore mentioned conditions

Hogan Thygeson and Kimura amply demonstrated that the various steroid agents only reduce inflammatory signs If the specific antibiotic will overcome the infecting organism the steroids will not be harmful If the infection is caused by a virus or is the result of resistant bacteria steroids may interfere with the natural resistance of the host and thus mitigate against recovery

Inasmuch as the steroids are only anti inflammatory and are not bactericidal or bacteriostatic in action Leopold suggested using antibiotics alone It is estimated that approximately 90 per cent of the population has antibodies for the herpetic virus Similarly it is well known that any break in the corneal epi thelium either from trauma or otherwise favors the development of a herpes keratitis These two factors make the latter an ever present threat and the practice of employing antibiotics without steroids a sound one

SUMMARY

Some of the better topical antibiotic and chemotherapeutic agents have been discussed The importance of frequent admini stration as well as the advantages of drop instillation over ointment application have been considered

Contraindications to the use of local anesthetics and steroid hormones were emphasized The former impede re epithelization of the cornea by inhibiting mitosis The latter are to be avoided in all corneal abrasions corneal ulcers keratitis, fungus in fections where foreign bodies are present and especially in any ocular condition where there is an element of doubt as to cause A herpes simplex keratitis which so frequently results from indiscreet steroid therapy, is an extremely serious ocular condition It poses a formidable threat to vision and indeed to the eye itself

REFERENCES

1 Adl F H *Phys logy of the Eye* C V M by Co St L M 1950
2 L p ld I H. R t d an o ul th py *New York J M d* 56 2803-2812 Sept 15 1956
3 H W H T p l b y d *P tgrad Med* 20 525-527 No 1956
4 Sw K C. d Wh N G C l p m b lity f t ff ct g p tt f dr g t *Am. J Opbth* 25 1043-1058 S p 1942

5 Buschke W Fri d wald J S and Fl i hm W Studies mit tic ctivity f c rneal pith li m m thods Effects of colchici ther coc ne and ephedri *Bull Johns Hopkins H sp* 73 143 167 S pt 1943
6 G ders n T d Liebm S D Eff ct f l c l nesth ucs on reg n r tion of corn l ep thelium *Arch Ophth* 31 29-33 Ja 1944
7 F ied nw ld J S and Bu bke W I fl f som xperime t l v riables on pith l l moveme t t healing of c r eal wounds *J Cell. & Comp Physi L* 23 95 107 Apr 1944
8 Hogan M J Thygeson P a d Kimura S J Effects f prednisone and pred is l n t oc lar i flamm t o T *Am. Acad Ophth* 59 779 782 Nov D c 1955
9 *Sery T W Unp blished d t*

THIS MUST BE AVOIDED

The times in which we are living are dangerous and uncertain The question of whether our country will be engaged in fighting a "brush fire a hot war " or whether we will be faced indefinitely with a "cold war is of course unanswerable It would appear however that we are living in a period when for the best of our country our profession and for what we believe to be a desirable way of life personal wishes and preferences will have to give way to what is considered by our leaders as necessary for the group as a whole This is not the time to figure the angles as such a course may bring disrepute on ourselves and our profession We as individuals and as members of a profession are under an increasingly critical survey by groups which would like nothing better than to bring our profession under restrictive and bureaucratic control Anything we do which creates public suspicion of our aims ideals or mores provides ammunition for these critics One of the most serious of criticisms which might be made against us as individuals or as a profession is that we now lack *patriotism This must be avoided* —Perrin H Long The Doctors Draft (editorial) *Resident Physician* November 1958

PLEURISY WITH EFFUSION

Report of 98 Cases

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IDIOPATHIC pleurisy with effusion is predominantly a disease of early adult life and a high incidence is therefore to be expected in a military hospital population. The tuberculosis service of this hospital discharged 98 patients admitted because of supposed idiopathic pleurisy during the two year period between 1 October 1955 and 30 September 1957. The relative frequency of the ailment is indicated by the fact that these patients constituted 10.3 per cent of all patients discharged during that period.

While pleurisy with effusion is neither unusual nor novel it remains important in practice, especially in military practice, and our experience with these patients is reported in the belief that it will be of some general interest. For convenience the cases are herein divided into those classified at discharge as tuberculous pleurisy and those classified as nontuberculous.

TUBERCULOUS PLEURISY

Of the 79 patients considered to have tuberculous pleurisy, all males, 16 (20.1 per cent) were between the ages of 17 and 19, 42 (53.2 per cent) between 20 and 24, 10 (12.7 per cent) between 25 and 29 years, 10 (12.7 per cent) between 30 and 39, and 1 patient was more than 40 years of age.

Sixty one (77.2 per cent) of the patients were Caucasoid, 15 (18.9 per cent) Negroid, 1 (1.3 per cent) was a Mongoloid, 1 (1.3 per cent) a Malayan, and 1 (1.3 per cent) an American Indian. This representation approximates that usual on the service.

Twenty eight of the men were members of the U. S. Navy, 9 of the U. S. Marine Corps, 37 of the U. S. Air Force, and 5 of the U. S. Army, a distribution also in accord with that commonly found in our patients.

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Seventy of the patients were admitted to the sick list because of the symptoms of pleurisy, generally fever, prostration, stitch in the side, and dyspnea of acute onset, often associated with chills and cough Five cases were detected by routinely made chest photofluorograms or roentgenograms, a finding consistent with the evidence of old pleurisy noted at times in the chest roentgenograms of patients who can recall no relevant history Four patients developed pleural effusion while under treatment for unrelated ailments one for "sciatica," another for acute diarrhea (possibly febrile), a third for a remote fracture, and a fourth for amebiasis In this last case the possibility of amebic pleuritis was excluded by the identification of *Mycobacterium tuberculosis* in a culture of the pleural fluid

Associated Findings The right pleural cavity was involved in 36 (45 6 per cent) of the patients with tuberculous pleurisy, the left in 40 (50 5 per cent), and both cavities in 3 (3 9 per cent)

Roentgenograms of the chest revealed associated pulmonary lesions in 2 patients, right hilar lymphadenopathy in 1, calcified hilar lymph nodes in 2, and calcified mediastinal nodes in 1 One patient had scattered pulmonary calcifications and one a calcified primary complex All of the patients with the calci fications named reacted to histoplasmin as well as to tuberculin

Pericarditis proved to be tuberculous by biopsy, was as sociated with bilateral pleural effusion in the case of the Ameri can Indian Bacteriologically positive cervical lymphadenitis coexisted in another case, and in still another serial roentgen ograms showed rapidly progressive scoliosis toward the affected side, thought to be the result of advancing fibrothorax

Since the majority of the patients had been treated by one or more thoracenteses during the acute phases of their illnesses and 16 had been placed on chemotherapy prior to their admission to our service, only 31 (39 4 per cent) had residual or re forming pleural fluid after arrival, and some of these had so little fluid that thoracentesis appeared to be superfluous

When asked to describe the fluid removed from their chests, with surprising regularity the patients likened it either to beer or to urine When the fluids were examined the two constant clinicopathologic findings were a high percentage of protein and a predominance of lymphocytes in blood cell counts One specimen of fluid contained many eosinophils

The results of bacteriologic examinations, made both before and after the patients arrived at our hospital, were extremely meager In only 13 (16 5 per cent) of the 79 cases was tubercu losis proved bacteriologically In two cases acid fast bacilli were seen in smears of the pleural fluid, and in four other cases *Myco tuberculosis* was identified by culture of the fluid In one case the sputum was positive by smear, and in

another by culture and in a third the gastric content was positive by culture In the remaining four positive cases the organism was recovered from tissue specimens twice after decortication once at pericardial biopsy and once from a biopsied cervical lymph node

The health records of Navy and Marine Corps patients offered some evidence as to the time lapse between photofluorographic negativity of the chests of these patients and the time of their clinical admissions with pleurisy One patient developed pleurisy with effusion about one month after having been pronounced negative by this method of examination and one had not been thus examined for 29 months On the average pleurisy in these patients occurred 8 4 months after reported normal photofluorograms These figures emphasize the rapid development of the syndrome

Immunologic Data All of the patients were tested intradermally with tuberculin (PPD 0 00002 or 0 0001 mg or old tuberculin 1 100) coccidioidin (1 1000) and histoplasmin (1 1000) All reacted to tuberculin with one exception The exception was a youth from whose pleural fluid *Myco tuberculosis* was recovered in culture by an unquestionably reliable laboratory prior to his arrival at our hospital In this case it was decided—we hope correctly—that the bacteriologic evidence must outweigh the immunologic

Two patients (2 5 per cent) reacted to coccidioidin one of whom had acid fast bacilli in his sputum and 13 (16 5 per cent) reacted to histoplasmin three of whom on appropriate examination were found to harbor *Myco tuberculosis* The percentages of these patients reacting to coccidioidin and to histoplasmin were less than those usually encountered among our patients of whom about 5 per cent react to the former and about 20 per cent to the latter antigen

Recruits of the U S Navy and Marine Corps have been tested with tuberculin (0 0001 mg of PPD) upon enlistment since 1949 and the result of the test is usually available in the person s health record Six of the Navy enlisted men and Marines here considered entered the service prior to the institution of this program and in two other cases the result of the test was not available In 28 (96 6 per cent) of the remaining 29 cases, conversion of the patients reactions to tuberculin from negative to positive between the time of their enlistment and the time of their clinical admissions was demonstrated In 21 of these conversion occurred within the first three years in the service One of the patients converted his reaction after hospitalization

One member of the U S Army tuberculin negative at the time of his admission likewise became a reactor while under observation

The phenomenon of conversion of the tuberculin reaction and the phenomenon of pleurisy with effusion thus coincided in 28 of the 29 instances in which both could occur in this material

Treatment The currently accepted treatment for tuberculous pleurisy consists of chemotherapy with streptomycin sulfate, isoniazid, and para aminosalicylic acid in some combination for a minimum period of one year, together with more or less rest in bed Sixteen of these patients already had been placed on some program of chemotherapy prior to admission to our hospital Most of the remainder were given chemotherapy according to the Veterans Administration Armed Forces protocols for the chemotherapy of tuberculosis [3] There were no relapses during our observation of the patients

The place of bed rest in the treatment of tuberculous pleurisy is a subject of debate at the present time These patients were managed by a program aiming at 16 hours in bed each day for about four months prior to ambulation

The desirability of draining off pleural effusions is likewise a moot question Thoracentesis was performed in these patients as often as might be necessary to keep the affected pleural cavity reasonably "dry" in the hope of avoiding thick pleural peels and fibrothorax The steroid hormones were not used, although their usefulness for this purpose is currently under investigation In this connection, the usefulness of roentgenograms of a lateral view of the chest should be emphasized, because they often distinguish a massive pleuritis from a localized collection of fluid

One patient had been subjected to pleural decortication prior to his arrival and two were treated by this operation in our hospital—in the one case because of unresolved thick pleura and in the other because of progressive fibrothorax with resulting scoliosis

Disposition Thirty one (39 2 per cent) of the patients were recommended for return to military duty after treatment, and one was transferred to another military hospital for humanitarian reasons, ultimately returning to duty Forty seven patients (59 5 per cent) were transferred to Veterans Administration hospitals

Optimism as to prognosis in this disease is justified by the highly satisfactory treatment results recently reported by Schless Harrison and Wier in a series of 250 similar cases observed for from one to four years

NONTUBERCULOUS PLEURISY

During the same two year period 19 patients with some form of pleurisy of essentially the same age and racial distribution, were discharged from the service with diagnoses other than tuberculous pleurisy Eight of these were admitted with chest

symptoms while 11 were detected by routine roentgenograms The effusion was discovered in two patients when they were examined for hernia in a third patient when examined for anatomically remote trauma and in a fourth for a recent direct crushing injury to the thorax on the side of the effusion In no case was *Myco tuberculosis* discovered by any method of examination

Twelve patients did not react to tuberculin including 2 in whom the effusion was thought to be the result of trauma 2 with empyema (*Klebsiella pneumoniae* was recovered from one of these) and 1 with hydropneumothorax following spontaneous pneumothorax In 7 patients one of whom was subjected to pleural biopsy there was no apparent explanation for pleurisy

Six of the patients tested reacted to tuberculin Two of these displayed pleural caps only in roentgenograms one had empyema due to *K pneumoniae* one a serosanguineous sterile effusion following direct external trauma and one a hydropneumothorax following misadventure during brachial block anesthesia In one patient decortication was carried out with the finding of granuloma " bacteriologically negative In retrospect this patient should probably have been considered tuberculous

One patient found to have purulent empyema on admission was transferred at once to the thoracic surgical service without tuberculin test

All of these patients were returned to military duty after treatment

Comment While the classification of these cases into tuberculous and nontuberculous categories was arbitrary at times we believe that the data regarding conversion of the tuberculin reaction in our Navy and Marine Corps patients show that the tuberculin skin test reaction alone in a young American is an excellent diagnostic criterion The recently advocated pleural biopsy[4] must of course be taken into account in the future and a study comparing tuberculin conversion with findings at pleural biopsy is in progress

SUMMARY

Ninety eight cases of known or supposed pleurisy with effusion were processed by a military tuberculosis service in a two year period Seventy nine of these were classed as tuberculous 19 as nontuberculous Conversion of the tuberculin reaction from negative to positive occurred in 28 of the 29 Navy and Marine Corps patients considered to have tuberculous pleurisy in whose cases data were available The value of the tuberculin test as a diagnostic criterion in pleurisy is emphasized

REFERENCES

L R per W H. and Waring J J Primary s rofibrin us pleural effusion in military personnel *Am. Rev Tuberc* 71 616-634 May 1955

2. Sp ncer G E. and Gray J A. C. Problem of Histopl smosis in military tuberculo is hosp tal. *Am. Rev. Tuberc* 75 833-835 May 1957

3 Pr tocol fo the chemoth ra y f tub rculosis as re ised follow ng the 16th Veterans Admin stration-Armed Forc s Conf rence n St. Louis Mo Feb 11 14 1957 In *Transact ons of the 16th Conference on the Chemotherapy of Tuberculosis* St. Louis M F b 11 14 1957 by th Veterans Administration and the Armed F c with the cooperation f th N t l Tuberculos s Association pp 502-503

4 Schless J M. Harrison H N a d W er J A. R l of thoracot my in differenti l diagn is f pl ural ffus s In *Transact ons of the 17th Conference on the Chemotherapy of Tuberculosis* M mph s T nn. Feb 3-6 1958 by the Veterans Admi i stratio and the Armed F rc w th th c p ratio of the N tional Tuberc losis Associ ti n. pp 163 170

5 Stead W W E chenholz A. nd Stauss H N Operative and pathologic findings in 24 patient w th syndrome of id op th c pleur sy with ffusion presumably tuberculous *Am. Rev Tuberc* 71 473-502 pr 1955

6 Hill H. E. Hen ler N M. nd Br ckl r L A Pl ural bi psy n diagnosis of ef fusio r sult in 50 ca s of pl ural diseas obs rved cons cuti ly *Am. Rev Tuberc* 78 8-16 July 1958

7 Do oho R F Kat. S d M tthew M. J Pleural biopsy as aid in etiologic diag s of pleural ffus on r view of literature and r port of 13 b opsies *Ann Int M d.* 48 344-362 F b 1958

USE OF OBSTETRICAL FORCEPS

All obstetricians recognize the fact that the risk in forceps deliveries increases about in arithmetical progression with the height of the presenting part in the birth canal The confusion exists with respect to what is meant by head on the perineum" or head at mid pelvis Many doctors think that this refers to the location of the scalp in the birth canal Actually an obstetrician is interested only in the location of the plane of greatest diameters of the presenting part in the pelvis In a vertex presentation this plane of the presenting part is bounded by the biparietal and the sub occipitobregmatic diameters The relationship between the plane and the scalp may vary within wide limits in labor due to molding or development of caput succedaneum or cephalhematoma Failure to recognize this fact lead to many mistakes in determining the exact location of the plane of greatest diameters in the birth canal and consequent improper use of forceps —W F H Article on the Use of Forceps (editorial) *Pennsylvania Medical Journal*, [illegible] 1958

symptoms while 11 were detected by routine roentgenograms The effusion was discovered in two patients when they were examined for hernia in a third patient when examined for anatomically remote trauma, and in a fourth for a recent direct crushing injury to the thorax on the side of the effusion In no case was *Myco tuberculosis* discovered by any method of examination

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GENERAL

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1 Aviation medicine on the threshold of space a symposium *J Aviat M* 1958 29 485 539 Contents CAMPBELL P A Achievements of the past year pp 485 492 SCHAEFER H J New knowledge of the extra atmospheric radiation field pp 492 500 BEISCHER D E Potentialities and ramifications of life under extreme environmental conditions pp 500-503 GERATHEWOHL S J and STALLINGS H D Experiments during weightlessness a study of the oculoagravic illusion pp 504 516 BESON E E Design considerations of a balloon borne pressurized capsule for high altitude bail out study pp 516-525 HAWKINS W R The feasibility of recycling human urine for utilization in a closed ecological system pp 525 535 CLARK C C A closed food cycle atomic conservation for space flight pp 535 539

2 *Behind the sputniks* a survey of Soviet space science Washington D C Public Affairs press 1958 vi 380 pp F J Krieger [editor] Especially Part III Biological factors ISAKOV P K Problems of weightlessness pp 126-133 BALAKHOVSKII I S and MALKIN V B Biological problems of interplanetary flights pp 134 145 ROZENBLAT V V Before flight into the cosmos pp 146-155 POKROVSKII A V Vital activity of animals during rocket flights into the upper atmosphere pp 156-163 The above papers are listed separately and more completely in this bibliography as items 297 92 106 and 105 respectively

3 BERRY C A The environment of space in human flight *Aeronaut Eng Rev* 1958 17 35 39 (No 3 Mar) Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 41)

4 BINAGHI A Introduccion al estudio del comportamiento de la fisiologia humana en astronautica [Introduction to the study of the behavior of human physiology in astronautics] *Sem med B Air* 1958 112 979 992

5 [Brief report on biological aspects of Sputnik II] *Naturwissenschaft rundschau* 1958 11 21

6 British Interplanetary Society Symposium on space medicine London 16th 17th October 1958 [Papers] [London 1958] The National Library of Medicine has the following papers BILLINGHAM, J Heat exchange between man and his environment on the surface of the moon 7 pp BILLINGHAM J Man s thermal environment during interplanetary travel 7 pp HANSON S W F Some problems of space feeding (abstract) 1 p BJURSTEDT H Effects of prolonged exposure to positive g loadings on the pulmonary gas exchange (abstract) 2 pp CLEMEDSON C J Some blast studies with application to explosive decompression 5 pp CUNNINGHAM C The effects of sensory impoverishment confinement and sleep deprivation 5 pp GUIGNARD J C The physiological effects of transient mechanical forces a review

of their relevance to astronautics [5] pp HOOVER G W The man machine system in space vehicles 10 pp 14 figs JACKSON K F Impairment of human performance in control 4 pp LANSBERG M P Some consequences of weightlessness and artificial weight 4 pp PARKES A S and SMITH A U Space transport of life in the dried or frozen state 3 pp

7 British Interplanetary Society Symposium on space medicine *Brit. M. J.* 1958 2 1035-1037 Brief review of selected papers

8 BUGROV B G and others Issledovaniia zhiznedeiatelnosti zhivotnykh pri poletakh v negermeticheskoi kabine raket do vysoty 110 km [Studies on vital functions in animals during flight in non-hermetic cabins in rockets up to 110 km.] In Preliminary results of scientific researches on the first Soviet artificial earth satellites and rockets Articles XIth Section of IGY program (rockets and satellites) No. 1 Moscow Academy of Sciences 1958 pp. 130-149 In Russian with brief summary in English

9 CAMPBELL P A The utilization of a satellite laboratory for life science studies 51 pp [1958] Paper presented at the Second Annual AFOSR Astronautics Symposium Denver Colorado April 29 1958

10 CHAMPLIN G A The challenge of man's entry into space *M. I. M.* 1958 123 422-427

11 CLEMEDSON C J Med jordiska och Kosmiska mattnagra rymdfysiologiska och medicinska problem [Earthly and cosmic standards of measurement problems of space medicine] *Sven. lak. tidn.* 1958 55 293-320 General review of space medicine problem

12 COOLEY D G Man in space *Today's Health* 1958 36 31-37 Mainly photographs

12 DEBIJADI R and WESLEY TANASIJOVIC I Covek u kosmosu uvod u kosmicku medicinu [Man in the space introduction to space medicine] *Voj. san. pregl. Beog.* 1958 15 556-557

13 FENN W O The challenge of space medicine *A. I. B. S. Bulletin* 1958 8 15 (No. 2 Apr.)

14 Flight to the moon the complete story in pictures of DONALD FARRELL'S week long simulated space voyage at the USAF School of Aviation Medicine *Astronautics* 1958 3 32-34 (No. 4 Apr.)

15 GALKIN A M and others Issledovaniia zhiznedeiatelnosti zhivotnykh pri poletakh v germeticheskikh kabinakh raket do vysoty 212 km [Studies on vital functions of animals during flights in hermetic cabin of rockets up to 212 km.] In Preliminary results of scientific researches on the first Soviet artificial earth satellites and rockets Articles XIth Section of IGY program (rockets and satellites) No. 1 Moscow Academy of Sciences 1958 pp. 112-129 In Russian with brief summary in English

16 GRANDPIERRE R and BOUVEROT P Incidences physiopathologique de l'emploi des fusées comme moyen de transport

[Physiopathological factors in the use of rockets as a means of transportation] *Concours med* 1958 80 265 267 269 270

17 GUIGNARD J C Spaceman overboard *Spaceflight* 1958 I 282 287 Especially section on vision

18 HAWKES R Weightlessness crucial spaceman factor *Aviation Week* 1958 68 50 51 53 55 57 (No 5 Feb 3) Space medicine research at Aero Medical Field Laboratory Holloman AFB described

19 HAWTHORNE R and DeBIASI V Advancing the vertical frontier" *Space aeronautics* 1958 30 22 23 193 Notes on selected papers presented at the Second international symposium on physics and medicine of the upper atmosphere and space School of Aviation Medicine Randolph AFB Texas November 1958 Complete listing of papers presented pp 23 193 For additional notes on the Symposium see *Sci News Letter* 1958 74 326

20 HECHT F (editor) VIIIth international astronautical congress Barcelona 1957 Vienna Springer 1958 vii 607 pp Especially BECKH H J VON Multidirectional G protection in space vehicles pp 37 46 BUN T P and PEREIRA F A Biospheric Index a contribution to the problem of determination of the existence of extra solar planetary biospheres pp 63 KAULBERSZ J and others Alterations in some blood reactions and in the white cell count during the total eclipse of the sun in Poland 1954 pp 236 240 SIMONS D G Observations from the Manhigh II balloon capsule at 30 kilometers pp 388 394 SLATER A E The probability of intelligent life evolving on a planet pp 395 402 WINZEN O C Ten years of plastic balloons pp 436-459 WINZEN O C The Manhigh II balloon operation pp 460 463 GERATHEWOHL S J and others Producing the weightless state in jet aircraft pp 533 542 Von Beckh s paper was also published *J Brit Interpl Soc* 1958 16 525 533 and (in Spanish) *Astronautica* (Barcelona) 1958 5 163 168 Gerathewohl s paper was published elsewhere as indicated by entry in item 284 of this bibliography

21 Homo spaciens *Physician s Bulletin* 1958 23 67 69

22 ISAKOV P K Life in Sputnik a Russian biologist examines problems involved in keeping a living organism alive in space and reveals Soviet approaches *Astronautics* 1958 3 38 39 49 50 (Feb)

23 ISAKOV P K and MALKIN V B Voprosy meditsiny pri mezhplanetnykh poletakh [Medical problems in interplanetary flight] *Med rabot* 1958 No 7 24 Ja p 4 Review of a volume of 23 translations into Russian from the foreign literature Articles translated by Armstrong Haber Strughold Von Beckh Gaspa Ballinger Schaefer etc

24 KONECCI E B Human factors in space flight *Aero/Space Engineering* 1958 17 34 40 (Dec)

25 KOUSNETZOV A G Some results of biological experiments on rockets and Sputnik II *J Aviat Med* 1958 29 781

26 LAMBERTSEN C L From submarines to satellites *Ci cul Res* N Y 1958 6 405 409

27 LEAVITT W Blueprint for tomorrow space crews *A r Force* 1958 41 42 46 49 (No 5 My) Re earch at various U S Air Force installations described

28 LEAVITT W Man in space *Air Fo ce* 1958 41 109 117 120 123 (No 3 Ap)

29 MALKIN V Mediko biolog cheskie i sledovaniia na r ketakh predv r etel nyie itogi geofiziche kogo god [Med cal and biol gical research by means of rockets—preliminary f ndings of the IGY *Sovetskaia Aviatsi a* 9 Se 1958 p 2

30 M n s scientific tole in space debated *Space Tech* 1958 1 47 50 (No 3 Jy) Summary of 2nd annual AFOSR tronaut cs symposium See especially rem rks of PAUL CAMPBELL on man vs instrumenta tion R printed in part *J Aviat M* 1958 29 625

31 MOWBRAY L Scaphandre pour le vide et demonstration d im pesanteur [Vacuum suit and demonstr tion of weightlessness] *Nature Pa is* 1958 pp 41 46 (Feb)

32 NAHAS G G Bi logie et médecine dans l e pace [B ology and medic ne in space *P oblemes* Par s 1958 No 53 Se Oct pp 60 62 64 67

33 PARTEL G L A tronaut c Rivista Aeronautica (Rome) 1958 34 491 529 Animali nello spaz o [Anim l in space] pp 522 525 L uomo nello pazio [M n in space] pp 525 526 P oblemi bi log ci della navigazione interplanetaria [Biologic l problems of interpl netary flight] pp 527 529

34 PHOEBUS C P Accommod ting th spaceman U S Off ce of Naval Research *Resea ch Rev ews* 1958 pp 6 12 (Je)

35 Research at the School of Aviation Medicine USAF *U S Ai Fo ce M Serv D g* 1958 9 11 16 (No 3 My Je) *Space flight* pp 15 16

36 SHTFRNFEL D A Artif cial satellites (Iskusstvennyye sput niki) Transl tion prepared by Technical D cuments Li ison Office Wright Patterson AFB Ohio [2d revised and extended edition] 1958 viii 424 p Originally published by St te Publishi g House of Tech nical Theoretic l Literature Moscow 1958 Especi lly Man in cosmic sp ce pp 198 228 (gene l discussion of pace m dicine pr blems) and pp 249 254 (sealed cabin ec logy) Avail ble from Office of Technical Services U S Dept of Commerce Pric $6 (PB14135IT)

37 SILLEVAERTS C Les s tellites artif ciels Conquête de l air 1958 54 7 11 (No 4 Ap) B logical aspects of Sputnik II with remarks on some prior spac medical research

38 SIMONS D G Observations made during M nh gh II flight *Jet Prop* 1958 28 521 522

39 SIMONS D G Pilot reactions d[illegible] *J Aviat M* 1958 29 1 14

40 SIMONS D G State of the art [of a[illegible] factors *Astronautics* 1958 3 58-59 77 (no 11 [illegible])

41 Soviet writing on earth satellites and s[illegible] Citadel [c 1958] 253 pp Especially Man in [illegible] STERNFELD] pp 40-60 Life in Sputnik by P [illegible] [First published Komsomolskaya Pravda [illegible]

42 Soviets report to IGY on satellite dog *Aviat Week* 53 Account based on paper by VLADIMIR YA[illegible] IGY congress in Moscow Also *Space Tech* 19[illegible]

43 Sovetskie sputniki zemli [Soviet earth satellites] 21 p 1 (No 80 7 Oct)

44 Spaceships and submarine medicine linked at [illegible] posium *Scope Weekly* 1958 3 1 4 (No 39 S p 24 paper by DEAN BURK at International Symposium [illegible] space medicine held at the U S Naval Submarine [illegible] Conn

44a STRUGHOLD H Space medicine [editorial] 1958 7 9 10 (No 4 Apr)

45 STRUGHOLD H Staying alive in space *Air [illegible]* 87 (No 4 Apr)

46 TAYLOR E R Physical and physiological [illegible] nautics Randolph AFB Texas USAF School of March 18 1958 149 pp

47 Ten years of space medicine [editorial] *J [illegible]* 2024

48 U S Air Force Missile Development Center Base New Mexico Office of Information Services The beginnings of research in space biology at th Development Center Holloman Air Force Base New [by DAVID BUSHNELL] The Center [1958] iv 28 l

49 U S Air Force Missile Development Center Base New Mexico Office of Information Services Major achievements in space biology at the Air Fo ment Center Holloman Air Force Base New Me DAVID BUSHNELL The Center [1958] iv 61 l cal developments pp 2 7 Achievements in cosm op 7 24 Project Man High pp 24 44

50 U S Air Force School of Aviation Medicine as *Epitome of space medicine* Randolph AFB T ous paging A collection of previously publishe government reports numbered 1 41 The papers wit of publication and reference to their location in t etc) are individually listed throughout this bibli with their subject matter chronology etc

97 [GAUME J G and ROTH E M] To Mars and back how soon? *Air Force* 1956 39 47 52 Answers to questions on general problem of sp ce medicine asked by E M MILLER and H DUNCAN

98 HITCHCOCK F A Present st tus of space medicine *J Astro nautics* 1956 3 41 42 51 52 (No 2)

99 HITCHCOCK F A Some consideration in regard to the phy siology of space flight *Astronautica Acta* 1956 2 20 24

100 MALLAN L *Secrets of space fl ght* New York Arco [c 1956] 144 pp

101 MAYO A M Environmental consider tions of space tr vel from the engineering viewpoint *J Aviat M* 1956 27 379 389 Also *Interavia* 1956 11 435 438

102 MILLER E M and DUNCAN H Window into space *A r Forc* 1956 39 43 46 (No 12 Dec) Research at the School of Aviation Medicine Randolph Field Texas described

103 MULLER B Flugmed zin Kompendium der Luftfahrtmedizin [Flight medicine compendium of aviation medicine] 236 pp Dussel dorf Droste 1956 (Nordrhein Westfalen M niste um fur Wirtschaft und Verkehr Verkehrswissen chaftliche Veroffentlichungen Heft 34) Especially chapter 9 Weltraumflug [Space flight] pp 209 222

104 NIELKE H *D r Weg ns All* Berlin Neues Leben 1956 Men ch und Weltraumflug [M n and space flight] pp 194 213

105 POKROVSKI A V Study of the vital act v ty of animals during rocket flight into the upper atmosphere In KRIEGER F J *A case book on Sov et ast onautics* Part II Santa Monica Calif Rand [1957] pp 163 172 (USAF project Rand Research memor ndum RM 1922 21 June 1957) Report presented at the Congres nternationale des fusees et eng ns guides Pari Dec 3 8 1956 In French *Fusees et recherche ae onautique* 1958 3 5 7 English summary *Jet P op* 1957 27 186 188 Dogs rocketed to 100 Km and recovered

106 ROZENBLAT V V Before flight into the cosmos In KRIEGER F J *A cas book on Sovi t astronautics* Part II S nta Monica Calif Rand [1957] pp 131 144 (USAF project Rand Rese rch memorandum RM 1922 21 June 1957) First published in *Nauka i Zhizn* 1956 23 25 28 (No 11 Nov)

107 STEWART W K High altitude and space travel *J R Soc Promotion Health* London 1956 76 423 424

108 STRUGHOLD H Medical problems involved on orbit l space flight *Jet Prop ls on* 1956 26 745 748 756 788 Also in USAF Sch ol of Aviation Medicine Randolph AFB Texas *Epitome of space m d cine* (Item 32)

109 STRUGHOLD H A s mple cl sif cat n of the present and future stages of manned fl ght *J Aviat M* 1956 27 328 331 Also

in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 31)

1955

110 BECKH H J A VON *Fisiologia del vuelo* [Physiology of flight] 147 pp Buenos Aires Alfa 1955 Especially La gravitacion cero [zero g] pp 99 110 Aspectos fisiologicos del vuelo espacial [Physiological aspects of space flight] pp 111 123

111 BENFORD R J *Doctors in the sky* the story of the Aero Medical Association Springfield Thomas [c 1955] Especially Es tablishment of] Space medicine branch pp 228 232

112 BRADSHAW P Problems of the manned rocket *J Camb Univ Interpl Soc* 1955 1 27 29 (Je)

113 CAMPBELL P A Aeromedical and biological considerations of flight above the atmosphere *J Brit Interpl Soc* 1955 14 1 12 Also in CARTER L J (editor) *Realities of space travel* London Putnam 1957 pp 251 265

114 FISHER A C Aviation medicine on the threshold of space *Nat Geog Mag* 1955 108 241 278 Review of article *J Aviat M* 1955 26 355

115 HENRY J P Physiological laboratories in rockets *Astronautics* 1955 2 22 26 Same title *Bull Med Res* 1956 10 2 4 (No 3)

116 JONGBLOED J Ruimtevaartgeneeskunde [Physiological aspects of space travel] Aeromedica acta 1955 4 11 17

117 KENTOSH M The human body in space *Michigan Technic* 1955 73 14 15 24 36 38 56 (No 7 Ap)

118 MALLAN L *Men rockets and space rats* N Y Messner 1955 335 pp

119 Man in space *Lancet* 1955 1 601

120 ROTH E M Medical aspects of travel in outer space *Harvard Med Alumni Bull* 1955 29 10 13 (Jy No 4)

121 SLATER A E Medical and meteorological astronautics *Aero plane* London 1955 89 276 Brief discussion of medical and mete orological papers presented at the 6th annual congress of the IAS Copenhagen Aug 1 6 1955

122 STRUGHOLD H The medical problems of space flight *Internat Record M* 1955 168 570 575

123 STRUGHOLD H Space equivalent conditions within the earth s atmosphere physiological aspects *Astronautica Acta* 1955 1 32 40 Same title in German *Weltraumfahrt* 1955 6 2 5

124 I viaggi interplanetari dal punto di vista medico [travel from the medical point of view] *Minerva med* tary 506

1954

125 Aeromedical research implic tions of space flight In U S Depart ment of the Air Force *Flight su geon s manual* pp 471 473 (Air Force manual 160 5 Oct 1954)

126 Award for research in sp ce flight *J A M A* 1954 156 275 The Oberth Medal to Dr STRUGHOLD See also *J Aviat M* 1954 25 439

127 HABER H Man and machine between atmosphere and space *Aeronaut Eng R v* 1954 13 56 62 (Nov)

128 HABER H The physical environment f the flyer [Randolph Field Texas] USAF School of Av ation Med cine 1954 The aero pause pp 135 155 Bibliography pp 157 166

129 HENRY J P Flight above 50 000 feet a problem in control of the environment *Astronautics* 1954 1 12 19 (No 1)

130 JANJIC M Medical pr blems of pace flight *Vasiona* 1954 2 7 10 (No 1 Ja Mar) In Serbo C oati n

131 KENDRICKS E J and others Medical problem of space flight 21 pp In USAF School of Av ation Medicine Randolph AFB Texas *Ep tome of space m dici e* (Item 9) Reprinted from the Winter 1954 issue of *Inst uctors Journal* a publication of the Air Tra ning Command Contents KENDRICKS E J Men re now fly ng in sp ce pp 1 3 STRUGHOLD H L ving room in spac pp 3 10 Ch r cteri st cs of the earth s atmo pher pp 10 13 HABER H From high altitude flight to space flight pp 13 16 GERATHEWOHL S J The peculi r state of w ightlessness pp 16 21

132 OBERTH H *M nschen im Welt aum* 256 pp Dusseldorf Econ [1954] English tr nslation Man into sp ce New York Harper 1957

133 ORDWAY F I III and CANNEY H E Jr The respectability of astron utics as refl cted by recent developments in the United States In HECHT F (editor) *Bericht ube den V Internationalen ast o nautischen Kongress* Innsbruck 5 7 Ag 1954 Wien 1955 pp 226 247 Physical and medical research of the upper atmosphere and ap proaches to space pp 238 244

134 POPPEN J R Five years of space medicine *J Aviat M* 1954 25 366 367

135 Progress in space medicine [editorial comment] *J Av at M* 1954 25 323 324

136 SAENGER BREDT I A propo du IV Congre international d astron utique [On the 4th International congress of astron tics] *Med ae onaut* 1954 9 85 88 Brief review of medical paper pre sented at the 2d 4th Congresse

137 SEGAL H Sp ce medic *J So Af ican Interpl Soc* 1954 1 24 29 (Nos 2 3 Apr Sept)

138 [SERYAPIN A. D.] Man in cosmic space. In KRIEGER F. J. A casebook on Soviet astronautics. [Part I] Santa Monica, Calif.: Rand [c 1956] pp. 81–84. (USAF project Rand. Research memorandum RM 1760. 21 June 1956.) First published in *Teoriya i Metodika* 1954 22 1 7 (No. 7 Jy.)

139 Sky-high [editorial] *Brit. M. J.* 1954 2 1 44 1-45

140 STRUGHOLD H. Atmospheric space equivalence. *J. A. v. M.* 1954 25 420–424. Also in: USAF School of Aviation Medicine, Randolph AFB, Texas. *Epitome of space medicine* (Item 25)

1953

141 ARMSTRONG C. R. Space physiology. *J. Brit. Interpl. Soc.* 1953 12 172 175

142 BIGET P. L. Problemes physiologiques poses par l'astronautique [Physiological problems posed by space flight.] Meteorologie 1953 pp. 193 201 (No. 31 July Sept.)

143 Proceedings of a symposium on frontiers of man controlled flight. Presented at Los Angeles, California, April 3, 1953. Edited by HEINZ HABER. Los Angeles: University of California, Institute of Transportation and Traffic Engineering [c 1953] 1 v. Especially: LOMBARD C. F. Crew compartment atmosphere. pp. 5 7. TOBIAS C. A. Radiation hazards in high altitude aviation. pp. 21 41. HABER H. The mechanical environment of future aircraft. pp. 42 47. MAYO A. M. Engineering the cockpit for man. pp. 81 92. KAPLAN J. and others. Panel discussion on frontiers of man controlled flight, pp. 97 104.

144 CAMPBELL P. A. Atmosphere characteristics of greatest human significance in aviation of the next decade. *Aeronaut. Eng. Rev.* 1953 23 50 55 (Ap.) Also *Roy. Thai Air Force Med. Gaz.* 1953 2 389 398

145 CURTIS H. T. The frontiers of man controlled flight. *Pacific rocket society bulletin* 1953 6 Sect. B. pp. 1 4 (No. 5 My. 10)

146 ERREBO KNUDSEN E. O. and others. Verdens rummets erobring [Conquest of space] Copenhagen: Reitzel 1953. *Errebo Knudsen E. O.* Menneskelegemet og rummet [The human body and space] pp. 51 67

147 GASPA P. Problemes physiologiques poses par l'astronautique [Physiological problems posed by space flight] *Rev. path. gen. comp.* 1953 53 1485 1503

148 HABER H. *Man in space.* N. Y.: Bobbs Merrill 1953. 291 pp.

149 HABER H. Space medicine. In The complete work of outer space. [New York: *Maco Magazine* c 1953] pp. 24 35. Reprinted 1957

150 Rocket flights of mammals to 200 000 feet. *J. Brit. Interpl. Sc.* 1953 12 6 9. Mice in USAF Aerobee rocket.

151 Space medicine [editorial comment] *Canad M Ass J* 1953 69 535

1952

152 BARRON C I The dangers man faces in flights above 50 000 ft *SAE Journal* 1952 60 24 27 (Jy)

153 BAUER L H Space medic ne *W Virginia M J* 1952 48 326 327

154 BUETTNER K and HABER H The aerop use [letter to editor] *Science* 1952 115 656 657

155 CAMPBELL P A M dical spects of flight above the at mosphere *J A M A* 1952 150 3 6

156 CONLEY M A method of s pporting the hum n body structure during sp ce flight *J Spac Flight* 1952 4 3 4 (Nov No 9)

157 CURTIS H T An int rv ew with HEINZ HABER his views on space medicine and space fl ght *Pacific Rocket Soc Bull* 1952 5 Sect B pp 1 4 (No 11 Nov 10)

158 DIRINGSHOFEN H VON Medizinische Probleme der Raumfahrt [Medical problems of sp ce fl ght] In GARTMANN H (editor) Raum fahrtforschung [Space flight research] Mu chen Oldenburg 1952 pp 167 182

159 DIRINGSHOFEN H VON and BECKH H J A VON Aspectos medicos de la astron ut ca [Medical aspects of space flight] *Rev nac ae onaut* Buenos Aires 1952 12 18 22 (No 128 Nov)

160 HABER H Can we urvive in space? In Ryan C (editor) *Across the space f ontier* New York Viking 1952 pp 71 97

161 HABER H Flight at the b rders of space *Sci Amer* 1952 186 20 23 (Fe) Also in USAF School of Avi tion Medicine Randolph AFB Texas *Epitom of space med cine* (Item 16)

162 HABER H Manned flight at the borders of space *J Amer Rocket Soc* 1952 22 269 276 283 Also in USAF School of Avia tion Medicine R ndolph AFB Texas *Ep tome of space medicine* (Item 18)

163 HABER H Medical research in the development of manned rocket flight *Tech Data Dig* 1952 17 12 13 (Fe)

164 HABER H Der Mensch im Weltall [Man in space] Weltraumfahrt 1952 3 13 16

165 [HABER H] Problems of space travel *Sci News letter* 1952 62 180

166 [HABER H] [On space medicine problems] Hayden Planetarium symposium on space travel Oct 12 1951 *J Brit Interpl Soc* 1952 11 3 9

167 HECHT F Chemische Probleme des Weltraumfluges [Chemical problems of space flight] In KOLLE H H (editor) Probleme aus der astronautischen Grundlagenforschung (Vortrage gehalten anlasslich des III Internationalen Astronautischen Kongresses in Stuttgart vom 1 bis 6 September 1952) Stuttgart Gesellschaft für Weltraumforschung 1952 pp 30 38 Also *Weltraumfahrt* 1953 4 3 9 Includes bio chemical problems

168 LOMONACO T Alcuni probabili fenomeni fisio patologici dell'uomo durante i futuri voli siderali [Some probable physiopathologi cal phenomena of man during future space flight] *Riv med aeronaut* 1952 15 3 12

169 MAYER C F Exploration of space [editorial] *Mil Surg* 1952 111 435 436

170 SILLEVAERTS C Les problemes medicaux des vols au dessus de l atmosphere [Medical problems of flights above the atmosphere] *Bruxelles med* 1952 32 2518 2523 Also Conquête de l'air 1953 No 2 pp 21 25 Largely a translation of item 155 of this bibliography

171 Space medicine [editorial] *W Virginia M J* 1952 48 338

172 STRUGHOLD H From aviation medicine to space medicine *J Aviat M* 1952 23 315 318 329 Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 21)

173 WHITE C S The challenge to space medicine *J Aviat M* 1952 23 527 529

174 WHITE C S and BENSON O O Jr (editor) Physics and med icine of the upper atmosphere a study of the aeropause The proceed ings of a symposium on the physics and medicine of the upper at mosphere held at San Antonio Texas November 6 7 8 9 1951 spon sored by the Air University School of Aviation Medicine Randolph Field Texas Arranged by the Lovelace Foundation for Medical Educa tion and Research Albuquerque New Mexico xxiv 611 pp Albu querque Univ of New Mexico Press 1952 Contents WHITE C S Introduction pp 1 5 MAYO A M Basic environmental problems re lating man and the aeropause as visualized by the aeronautical engi neer pp 6-22 STRUGHOLD H Basic environmental problems re lating man and the highest regions of the atmosphere as seen by the biologist pp 23 34 HULBURT E O Physical characteristics of the upper atmosphere of the earth pp 35 53 KELLOGG W W Tem peratures and motions of the upper atmosphere pp 54-74 HABER F Adiabatic compression and friction pp 75 87 BUETTNER K Thermal aspects of travel in the aeropause problems of thermal radiation pp 88 98 KAPLAN J The chemosphere pp 99 108 REGENER V H Atmospheric ozone pp 109-122 HABER H Gravity inertia and weight pp 123-136 WHIPPLE F L Meteoritic phenomena and meteorites pp 137 170 SPECHT H Toxicology of travel in the aeropause pp 171 181 NICOLET M Solar physics and the a mosphere of the earth pp 182 225 BURNIGHT T R Ultraviolet

151 Space medicine [ed torial comment] *Canad M Ass J* 1953 69 535

1952

152 BARRON C I The danger man faces in flights above 50 000 ft *SAE Journal* 1952 60 24 27 (Jy)

153 BAUER L H Sp ce medicine *W Virginia M J* 1952 48 326 327

154 BUETTNER K and HABER H The aeropause [letter to editor] *Science* 1952 115 656 657

155 CAMPBELL P A Medical a pects of flight above the at mosphere *J A M A* 1952 150 3 6

156 CONLEY M A method of supporting the human body structure during space flight *J Space Flight* 1952 4 3 4 (Nov No 9)

157 CURTIS H T An nterv ew with HEINZ HABER his views on space medicine and space flight *Pacific Rocket Soc Bull* 1952 5 Sect B pp 1 4 (No 11 Nov 10)

158 DIRINGSHOFEN H VON Medizinische Probleme der Raumfahrt [Medical pr blems of pace flight] In GARTMANN H (editor) R um fahrtforschung [Sp ce flight rese rch] M nchen Oldenburg 1952 pp 167 182

159 DIRINGSHOFEN H VON and BECKH H J A VON Aspect s medicos de la ast onautica [Medical aspect of space flight] *Rev nac ae onaut* Buenos Aire 1952 12 18 22 (No 128 Nov)

160 HABER H Can we survive in pace? In Ryan C (editor) *Across the space f ontie* New Yo k Viking 1952 pp 71 97

161 HABER H Flight at the borders of space *Sci Amer* 1952 186 20 23 (Fe) Also n USAF School of Aviation Medicine Randolph AFB Texas *Ep tome of space med c ne* (Item 16)

162 HABER H Manned fl ght at the borders of space *J Ame Rocket Soc* 1952 22 269 276 283 Also in USAF School of Avi tion Medicine Rand lph AFB Texas *Epitome of space medicine* (Item 18)

163 HABER H Med cal research in the development of manned rocket flight *Tech Data Dig* 1952 17 12 13 (Fe)

164 HABER H Der Mensch im Weltall [M n in space] Weltraumfahrt 1952 3 13 16

165 [HABER H] Probl m of space tr vel *Sci News letter* 1952 62 180

166 [HABER H] [On space medicin p blems] Hayden Planet rium symposium on sp ce travel Oct 12 1951 *J B it Interpl Soc* 1952 11 3 9

177 CLARKE A C Interplanetary flight N Y Harper 1951 *The physiology of space* pp 113-117 cosmic rays 117 119 space suit pp 119 120

178 HABER H The human body in space *Scient Amer* 1951 184 16-19 (Ja) Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 12)

179 [HALDANE J B S] Biological problems of space flight *J Brit Interpl Soc* 1951 10 154-158

180 MARBARGER J P ed Space medicine the human factor in flights beyond the earth Urbana U of Ill press 1951 83 pp Contents IVY A C Foreword pp 9 11 ARMSTRONG, H G Space medicine in the United States Air Force pp 11 13 BRAUN W VON Multi stage rockets and artificial satellites pp 14-30 STRUGHOLD H Physiological considerations on the possibility of life under extra terrestrial conditions pp 31 48 HABER H Astronomy and space medicine pp 49-61 CAMPBELL P A Orientation in space pp 62-69 BUETTNER K Bioclimatology of manned rocket flight pp 70-83

181 Meeting of informal committee on space medicine *J Aviat M* 1951 22 163-164

182 Meeting of the Space Medicine Association Denver Colorado May 17 1951 *J Aviat M* 1951 22 544-547

183 ST GERMAIN A V Physiological aspects of interplanetary travel *Amer Helicopter* 1951 21 10-12

184 Space medicine a look at the depth of the universe *Tech data Dig* 1951 16 14-15 (Oct)

185 STRUGHOLD H The human time factor in flight II Chains of latencies in vision *J Aviat M* 1951 22 100-108 Author notes special importance of problem in rocket flight

186 STRUGHOLD H and others Where does space begin? Functional concept of the boundaries between atmosphere and space *J Aviat M* 1951 22 342 349 357 Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 15)

1950

187 ESCLANGON E La navigation astronautique dans ses rapports avec la physiologique [Space flight in relation to physiology] *Astronomie* 1950 64 279-287

188 HENRY J P Report on the 1950 Symposium of space medicine *J Space Flight* 1950 2 8-11 (My)

189 LANGER E Medizinische Probleme der Raumfahrt [Medical problems of space flight] *Med Klin. Berl* 1950 45 1634-1636

190 LOMONACO CROCE T L Uomo in volo Rome Abruzzini 1950 Alcune probabili manifestazioni dell'organismo umano nel futuro volo

intersiderale [Some probable reactions of the human rganism in future interplanetary flight] pp 469 476

191 Space medic ne [editorial comment] *J Aviat M* 1950 21 359 360

1949

192 ARMSTRONG H G and others Aero medical problems of space travel Panel meeting School of Aviation Medicine *J Av at M* 1949 20 383 417 Also in USAF School of Aviation Medicine Randolph AFB Tex s *Epitome of space med cine* (Item 11)

193 CAMPBELL P A Cybernetics and av ation medicine *J Aviat M* 1949 20 439 442

194 STORY V *Biological aspects of a space journey* Ch cago Rocket Society Collected technical reports Chicago the Society 1949 pp 48 50

1948

195 HENRY J Speculations on space travel *Rocket News lette* (Chic go) 1948 2 6-9 (No 3 Oct)

196 LOMONACO CROCE T L Org nismo umano resistera alle vari azioni ambientali di un viagg o interplanetar o? [Will the human or ganism be able to w thstand the environm ntal changes of an inter planetary journ y?] *Riv med aeronaut* 1948 11 84-87

1947

197 GOUGEROT L Perspectives physiologiques soulevees par le probl me astrona tique [Physiolog cal problems of pace flight] *M d a ronaut* 1947 2 63 74

1936

198 ARMSTRONG H G The medical aspects of the Nation l Geo graphic Society U S Army Air Corps strat sphere expedition of Novem ber 11 1935 *J Aviat M* 1936 7 55 62

1931

199 NORTON T W Physiological implic tion of rocket flight *Bull Amer Inte pl Soc* 1931 No 9 My pp 2 5

1929

200 OBERTH H Wege zur Raumsch ffahrt Munich Oldenburg 1929 Acceleration pp 90-99 Fr ctional g and weightlessne s pp 100-106 Cities TSIOLKOVSKII on immersion in liqu d to counteract g p 108

1928

201 VALIER M VON Medizin u d Raumschiffahrt [Med cine and spacesh p flight] Die R kete *Zeitsch ft d s Ve e ns fur Raum schiffah t E V* 1928 2 13-15 20-22

SEALED CABIN PROBLEMS

1958

202 Air Crew Equipment Laboratory Naval Air Material Center Phila Pa Environmental requirements of sealed cabins for space and orbital flights Part 1 Introduction to a confinement experiment and description of the test chamber Reported by F HENDLER [and] D A MANCINELLI v 4[6] leaves (NAMC AGL 383 27 August 1958 TED NAM AF 1403)

203 Air Crew Equipment Laboratory Naval Air Material Center Phila Pa Environmental requirements of sealed cabins for space and orbital flights Part 2 Continuous exposure of human subjects to increased oxygen tension for seven days Reported by I L MICHEL and R W LANGEVIN v 6[6] leaves (NAMC AGL 384 10 September 1958 TED NAM AF 1403 part 2) Summary of the data presented as Men survive high oxygen [by C F GELL] *Sci News Letter* 1958 74 343

204 Air Crew Equipment Laboratory Naval Air Material Center Phila Pa Environmental requirements of sealed cabins for space and orbital flights Part 3 Performance and habitability aspects of extended confinement Reported by J CAITO [and others] v 31 [21] leaves (NAMC AGL 385 26 September 1958 TED NAM AF 1403 part 3)

205 Air Crew Equipment Laboratory Naval Air Material Center Phila Pa Environmental requirements of sealed cabins for space and orbital flights Part 4 Physiological changes produced in humans by prolonged confinement in an oxygen rich environment Reported by I M LIBBER [and others] v 5[5] leaves (NAMC AGL 386 8 October 1958 TED NAM AF 1403 part 4)

206 BORISOV V Problems in science and technology hermetic cabin of a space vehicle English summary U S Central Intelligence Agency Scientific information report 25 July 1958 pp 77 79 First published *Sovetskaya Aviatsiya* 18 June 1958 p 3 The Russian article includes a review of some recent American experience

207 CLAMANN H G Problems of respiratory metabolism in sealed cabins In Royal College of aeronautics London High altitude and satellite rockets a symposium held at Cranfield England 18th 20th July 1957 Published jointly by the Royal Aeronautical Society [and] the British Interplanetary Society London 1958 pp 102 106 and Joint discussion pp 111 114 Also (with minor changes and without the discussion) USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 40)

208 CALFORD R D and others The provision of respiratory gas exchange for small primates by use of a photosynthetic gas exchanger preliminary observations 5 pp (USAF School of Aviation Medicine Randolph AFB Texas [Report] 58 126 October 1958)

228 DRYDEN C E and others Artificial cabin atmosphere systems for high altitude aircraft xxiii 395 pp (USAF Wright Air Development Center WADC Technical Report 55 353 November 1956)

229 HAVILAND R P Air for the space ship *J Aeronautics* 1956 3 31 32 48 Substitutes for n trogen considered and rejected.

230 SIMONS D G Surface temperatures of animal capsules floating above 80 000 feet (Holloman Air Development Center Technical report 56-6 May 1956)

231 SIMONS D G and PARKS D P Climatization of animal capsules during upper trato phere balloon flights *Jet propuls on* 1956 26 565 568

232 STRUGHOLD H The U S Air Force experimental sealed cabin J *Av at M* 1956 27 50 52 Also in USAF School of Aviation Med icine Randolph AFB Texas *Epitome of space m dicine* (Item 28)

233 U S Office of Naval R search Proceedings Conference on photosynthetic gas exchangers Washington D C June 11 12 1956 ii 96 pp (ONR Symposium report ACR 13)

1955

234 HALDANE J B S The purification of air during space travel *J B t Interpl Soc* 1955 14 87 89

1954

235 BASSHAM J A Atmo pher c control by photosynthesis U S Office of Naval Research *Research v eus* 1954 Nov pp 7 12

236 BASSHAM J A Use of contr lled photosynthesis for maintenance of gaseou environment 10 pp (University of California Radiation laboratory UCRL 2707 Sept 1954)

237 FENNO R M Man s milieu in pace a summary of the physio logic requirements of man in a sealed cabin *J Aviat M* 1954 25 612 622 Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space med c ne* (Item 26)

238 HOFF E C and GREENBAUM L J A bibliographical source book of compressed air diving and submarine medicine Volume II xii 368 pp Washington D C [U S Govt Pr nt Off] 1954 (Navmed P 5033 November 1954) Espec ally Physiolog cal effects of high carbon dioxide content in environmental air pp 54-71 Heat and h mid ity problems pp 71 95

239 MURRAY W D A gondola for phys ological research in the at mospher *J Av at M* 1954 25 354 360

240 MYERS J Ba i marks on the use of plants as biological gas exchangers a closed system *J Aviat M* 1954 25 407 411 Also in USAF School f Av tion Medicin Randolph AFB T

of space medicine (Item 24) Work under USAF Contract No AF 18(600) 618 with the University of Texas Dept of Zoology

241 NICOLL N R Design of the life compartment necessary for space travel *J Brit Interpl Soc* 1954 13 277 282

1953

242 BOWMAN N J The food and atmospheric control problem on space vessels I Chemical purification of air II The use of algae for food and atmosphere control *J Brit Interpl Soc* 1953 12 118 123 159 167 *Also in* CARTER L J *(editor) Realities of space travel* London Putnam 1957 pp 275 291

243 BRAUN W VON Das Leben in der Buchse zum Problem der Atemluftversorgung in Raumschiffen [On the maintenance of adequate respiratory air in space ships] *Natur u Technik* 1953 7 54 55

244 LEE M F and others Basic requirements for survival of mice in a sealed atmosphere *J Aviat M* 1954 25 399 406 432 Also USAF Wright Air Development Center WADC Technical report 53 116 May 1953 iii 10 pp

1952

245 CLAMANN H G Continuous recording of oxygen carbon dioxide and other gases in sealed cabins *J Aviat M* 1952 23 330 333 Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 20)

1949

246 BOWMAN N J Nutritional and other physiological problems on extended space flights *Rocket News letter* Chicago 1949 2 6 11 (No 7 Feb) 8 16 (No 8 Mar)

1947

247 ROSS H E Green plants as atmosphere regenerators *Bull Brit Interpl Soc* 1947 2 7

1946

248 ROSS H E Air conditioning problems of space travel *Bull Brit Interpl Soc* 1946 1 49-52

1936

249 ARMSTRONG H G The medical problems of sealed high altitude aircraft compartments *J Aviat M* 1936 7 2 8

1935

250 ARMSTRONG H G The physiological requirements of sealed high altitude aircraft compartments 41 l (U S Air Corps technical report No 4165 December 19 1935)

1931

251 DEISCH N The navigation of space *Bull Amer Interpl Soc* 1931 No 11 Aug pp 4-10

ACCELERATION/DECELERATION

1958

252 BECKH H J VON Multi directional G protection in space flight and during escape a theoretical approach *J Aviat M* 1958 29 335 342

253 BECKH H J A VON Physiology of launching and re entry stress in rodents iii 8 pp (U S Air Force Missile Development Center Holloman AFB New Mexico AFMDC TN 58-11 August 1958)

254 BECKH H J A VON and SCHOCK G J D Centrifuge experiments on high G-loads in mice and their possible alleviation by multi directional anti G devices iii 14 pp (U S Air Force Missile Development Center Holloman AFB New Mexico AFMDC TN 58 10 August 1958)

255 BONDURANT S and others Human tolerance to some of the accelerations anticip ted in space flight iii 15 pp (Wright Air Development Center WADC Technical report 58 156 April 1958) Also *U S Armed F ces M J* 1958 9 1093 1105

1957

256 BROWNE M K Accelerations in space medicine *Spacefl ght* 1957 1 139 142

257 HESSBERG R R JR Accelerative forces associated with leaving and re entering the earth s gravitational field *J Astronautics* 1957 4 6 8 physiologically the accelerative forces are tolerable However motor performance is impaired and psychomotor f nction is unpredictable p 6

258 MARGARIA R *Le forze di accelerazione e la condizione di* subgravita in volo [Acceleration forces and the subgravity state during flight] *Riv med ae onaut* 1957 20 175 186 Polyglot summaries Describes immersion of animals in liquids to counteract g

1956

259 DIRINGSHOFEN H VON 25 Jahre in der luftfahrtmedizinischen Erforschung der Beschleunigungen ein Ruckblick und Ausblick [25 years aeromedical research of acceleration retrospect and prospect] *Medizinische* 1956 pp 1843 1847 (No 52 29 Dec) Acceleration problem in m nned rockets p 1846 problems of weightlessness pp 1846-1847

1955

260 PRESTON THOMAS H and others Human tolerance to multi stage rocket acceleration curves *J Av at M* 1955 26 390 398 The

present paper shows that a very large proportion of feasible rocket designs impose no undue strain on the passengers p 390

261 RAFFONE J J Acceleration force and space flight *J Astro nautics* 1955 2 100 104

1954

262 WEBSTER A P and HUNTER H N Acceleration *J Aviat M* 1954 25 378 379 Chart showing effects of G maximums by type on animals and humans

1953

263 GERATHEWOHL S J Die Psychophysiologie der Beschleuni gungswirkung [Psychophysiology of acceleration] *Weltraumfabrt* 1953 4 15 19

264 HABER F Human flight at the limits of the atmosphere G forces and weight in space travel *J Brit Interpl Soc* 1953 12 32 34 Also *Sky and Telescope* 1953 12 97 98 114 (No 4 Fe)

1952

265 BALLINGER E R Human experiments in subgravity and pro longed acceleration *J Aviat M* 1952 23 319 321 372

266 STEWART W K The physiological effects of gravity *Lectures on the scientific basis of medicine* 1952 1953 2 334 342

1951

267 CROCCO G A La sopportazione fisiologica nei missili a reazione [Physiological endurance and rocket flight] *Aerotecnica* Rome 1951 31 55 59

268 DIRINGSHOFEN H VON Beschleunigungswirkungen im Ront genbild [Acceleration effects in Rontgen exposure] *Weltraumfabrt* 1950 1 135 137

1950

269 SCHNEIDER J Der Mensch im Schwerfeld [Man in a gravitational field] *Weltraumfabrt* 1950 1 82 85

1949

270 HENRY J Rocket Society Acceleration as a limit in rocket flight In Chicago *Collected technical reports* Chicago the Society 1949 pp 45 47

1932

271 [NAYLOR J L] Man s ability to withstand high accelerations studied *Astronautics* 1932 No 20 Je pp 6-7

272 NORTON T W and MANNING L E The physiology of accel eration *Astronautics* 1932 No 21 Jy pp 4-6

FRACTIONAL AND ZERO GRAVITY

1958

273 Cornell probes weightlessness *Aviation Week* 1958 68 26 28 (No 2 Ja 13) Research of B R BUGELSKI at the Cornell Aero nautical Labor tory described See also *Sci News L tter* 1958 73 39 Dr Bugelski s research report is listed as entry 281a of this bibliography

274 GERATHEWOHL S J and STALLINGS H D JR Experi ments during weightlessness a study of the oculo agr vic illusion 22 pp (U S School of Aviation Medicine Randolph AFB Texas [Report] 58 105 July 1958) Also (with omission of appendixes) *J Aviat M* 1958 29 504 516

275 GIBERT A P and others Etat actuel de l expérimentation animale et humaine dans le vol en gravité nulle [Present state of ani mal and human experimentation in weightle s flight] *Med aeronaut* 13 177 188 English summary

276 KNIGHT L A An approach to the physiologic simulation of the null gravity state *J Aviat M* 1958 29 283 286 On spatial orientation during immersion in water

277 SCHOCK G J D Apparent motion of a fixed luminous target during subgravity trajector es 12 pp (U S Air Force Missile De velopment Center Holloman AFB New Mexico Report No AFMDC TN 58 3 Feb 1958)

278 SCHOCK G J D Sensory reactions related to weightless ness and their implications to space flight 10 pp (U S Air Force Missile Development Center Hollom n AFB New Mexic Report No AFMDC TR 58 6 April 1958)

279 U S Air Force Missile Development Center Holloman Air Force Base New Mexico Office of Information Services Historical Divi sion History of research in subgravity and zero-G at the Air Force Missile Development Center Hollom n Air Force Base New Mexico 1948 1958 by [DAVID BUSHNELL] The Center [1958] 46 pp

280 WARD J E Requirements for experimental zero gravity parab olas *J Av at M* 1958 29 428 432

1957

281 BIGET P L and BOITEAU H Q elques asp cts physio log q e du vol s ns pesanteur [Some physiological a pects of w ghtles ness in flight] *Fusees et recherche aero autique* 1957 2 161 165

281 BUGELSKI B R Beh vioral aspects of weightlessness Part I 41 pp (Hollom Air Development Center Holloman AFB New

Mexico Report No Cornell Aeronautical Laboratory 0 1186 V 1 November 1957)

282 GERATHEWOHL S J Weightlessness *Astronautics* 1957 2 32 34 74 75 (No 4 Nov) Responses of 47 subjects

283 GERATHEWOHL S J and STALLINGS H D The labyrinthine posture reflex (righting reflex) in the cat during weightlessness *J Aviat M* 1957 28 345 355 Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 36)

284 GERATHEWOHL S J and others Producing the weightless state in jet aircraft 11 pp (USAF School of Aviation Medicine Ran dolph Field Texas [report] 57 143 August 1957) Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 10) and *Astronautica Acta* 1958 4 15 24

285 GERATHEWOHL S J and others Sensomotor performance during weightlessness eye hand coordination *J Aviat M* 1957 28 7 12 Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 34)

286 LANSBERG M P The function of the vestibular sense organ and the construction of a satellite In *Aeromedica Acta* Special edition containing the scientific communications of the first European congress of Aviation Medicine Scheveningen (the Hague) 30 Oct 1 Nov 1956 Soesterberg National Aeromedical Centre 1957 pp 69 77 Problems of simulated g

287 LAWDEN D F The simulation of gravity *J Brit Interpl Soc* 1957 16 134 140

288 LOMONACO T and others Alcuni dati sperimentali fisio psichici sugli effetti delle accelerazioni e della sub-gravita previsti nell uomo lanciato nello spazio [Some physio psychic experimental data on the effects of accelerations and sub gravity predictable for man in space[*Riv Med Aeronaut* 1957 20 363 390 Polyglot sum maries Experiments on 30 subjects

289 MAC The problem of weightlessness Conquest (Jol annesburg) 1957 1 4 5 32 (No 3 Nov) Personal experiences

290 SCHACK G J D and SIMONS D G A technique for instru menting subgravity flights *J Aviat M* 1957 28 576 582 Same title U S Air Force Missile Development Center Holloman AFB New Mexico AFMDC TN 58 4 Feb 1958 14 pp

291 SLATER A E The problem of weightlessness *Spaceflight* 1957 1 109 113

292 STRUGHOLD H Mechanoreceptors gravireceptors *J Astro nautics* 1957 4 61 63 Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 39)

293 WALTON H JR A device for artificial production of alternating gravitational forces *J Av at M* 1957 28 291 294

294 WARD J E Requirements for present-day experimental zero gravity parabolas 6 pp (USAF School of Aviation Medicine Randolph Field Tex s [report] 57 121 July 1957)

1956

295 BECKH H J A VON *Gravity ch nges in aircraft and ships J Brit Interpl Soc* 1956 15 73 81

296 GERATHEWOHL S J Personal experiences during short periods of weightlessness reported by sixteen subjects *Astronautica Acta* 1956 2 203 217 Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 29) Italian translation Rev *Med Aeronaut* 1957 20 17 46 (Suppl to No 1 Jan Mar)

1955

297 ISAKOV P K Problems of weightle sness In KRIEGER F J A casebook on Soviet A tronautics [Part I] Santa Monica Calif Rand [c 1956] pp 229 239 (USAF project Rand Research memorandum RM 1760 21 June 1956) First published in *Nauka i Zhizn* 1955 22 17 20 (No 12 Dec)

298 SIMONS D G Review of biological effects of subgravity and weightlessness *Jet Prop* 1955 25 209 211

1954

299 BECKH H J A VON Experiments with animals and human subjects under sub- and zero gravity conditions during the dive and parabolic flight *J Aviat M* 1954 25 235 241

300 COE L A Some notes on the reactions of aircraft pilots to zero gravity *J Brit Inte pl Soc* 1954 13 244 Letter to the editor 20 subjects up to 20 seconds

301 Film of monkey and mice in free fall J B it Interpl Soc 1954 13 223 224

302 GERATHEWOHL S J Comparative studies on animals and human subjects in the gravity free state *J Aviat M* 1954 25 412 419 Also in USAF School of Aviation Medicine Randolph AFB Texa *Ep tome of space medic ne* (Item 25)

1953

303 BECKH H J A VON Untersuchungen uber Schwerlosigkeit an Versuch per onen und T eren Wahrend des lotrechten Sturzfluges [Inve tig ti of we ghtlessness of h mans nd nimals d ring vert cal dives] In *Sp il ght p oblems* being a complete collection of all lectures held t the Fo rth Astrona tical Congre s Zurich 1953 Biel Laubscher [1953] pp 196 202

304 GERATHEWOHL S J Zur Frage der Orientierung im Schwere freien Zustand [On the problem of orientation in the gravity free state] in *Space flight problems* being a complete collection of all lectures held at the Fourth Astronautical Congress Zurich 1953 Biel Laub scher [1953] pp 189 195 English abstract *Mil Surg* 1953 113 342 343

305 GOUGEROT L Loi de Weber Fechner et variations de la pesanteur apparente [The Weber Fechner law and variations of apparent weight] *Med aeronaut* 1953 8 119 125

306 HABER H and GERATHEWOHL S J Physik und Psycho physick der Gewichtslosigkeit [Physics and psychophysics of weight lessness] *Weltraumfahrt* 1953 4 44 50

307 LOMONACO T Primi studi sugli effetti fisiopatologici causati dalla subgravita in animali lanciati dentro missili nell'alta atmosfera [Initial studies of the physiopathological effects caused by subgravity on animals in rockets] *Riv med aeronaut* 1953 16 192 199 Story of U S research

308 MARGARIA R La condizione di subgravita e la sottrazione dall effetto delle accelerazioni [Subgravity and the elimination of the effect of acceleration] *Riv med aeronaut* 1953 16 469 474 Polyglot summaries On immersion in liquid to achieve effect

1952

309 BERGERET P La vie dans un milieu sans pesanteur [Life in the weightless state] *Atomes* 1952 7 219 224

310 GATLAND K W Design for zero G a man carrying rocket for physiological research in near space *Flight* London 1952 61 744 775 779

311 GERATHEWOHL S J Physics and psychophysics of weight lessness visual perception *J Aviat M* 1952 23 373 395 Also in USAF School of Aviation Medicine Randolph AFB Texas *Epit ome of space medicine* (Item 22)

312 HABER F Study on subgravity states 9 pp (USAF School of Aviation Medicine Randolph Field Texas Project number 21 34 003 Report number I April 1952) Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 4)

313 HENRY J P and others Animal studies of the subgravity state during rocket flight *J Aviat M* 1952 23 421 432

314 LOMONACO T and others Sulla fisiopatologia durante il volo nello spazio comportamento della coordinazione motoria in sog getti sottoposti a valori di accelerazione variante da 3 a zero g [Phys iopathology during space flight motor coordination in subjects exposed to acceleration values varying from 3 g to 0 g] *Riv med aeronaut* 1957 20 76 96 (Suppl to No 1 Ja Mar) Polyglot summaries

315 SLATER A E Sensory perceptions of the weightless con dition In KOLLE H H (editor) Probleme aus der astronautischen Grundlagenforschung (Vortrage geh lten anlasslich des III Internation alen Astronautischen Kongresses in Stuttgart Vom 1 bis 6 September 1952) Stuttgart Gesellschaft für Weltraumforschung 1952 pp 219 225 Also Annual report Brit Interpl Soc 1952 pp 342 348 and CARTER L J (editor) *Realities of space travel* London Putnam 1957 pp 266 274

316 THOMPSON L N Man w thout gravity the physiological and psychological problems of space flight *Flight* London 1952 61 298 300

1951

317 HABER H and GERATHEWOHL S J Phy ics and psycho physics of weightlessness *J Aviat M* 1951 22 180 189 Largely on interpretation of mechanotec ptor information Also in USAF School of Aviat on Med cine Randolph AFB Texa *Ep tome of space med icine* (Item 14)

318 [STRUGHOLD H and others] Wie wird sich der menschliche Organi mus voraussichtlich im schwerefreien Raum verhalten? [What is the probable behavior of th human organism in gravity free p ce?] *W eltraumfah t* 1951 2 81 88 See also r marks on th s by G W NOR BERT SCHOLZ *Ibid* 108

1950

319 Elevators to help determ ne effects of reduced gravity on super son c p lots *Tecbnical Data D g* 1950 9 (No 9) 11 12

320 GAUER O and HABER H M n under grav ty free conditions In U S Department of the Air Force German aviat on med cine World W r II W hington U S Govt Pr t Off [1950] pp 641-644

321 HABER F and HABER H Pos ible method of p oduc ng the gravity free state for medical research *J Aviat M* 1950 21 395 400 Also USAF School of Av tion Medic n R ndolph Field Texas Special pr ject January 1951 6 pp Also n USAF School of Avi tion Me dicine Randolph AFB Tex s *Ep t m of space m dicine* (Item 2)

322 SLATER A E The balanc ng mechan sm of the inner e r *J B it I terpl Soc* 1950 9 18 23

323 STRUGHOLD H The mecha oreceptors of kin and mu cles under fly ng conditions In U S Departme t of the Air Force Germ n viat on medicine World War II Washington U S Govt Print Off [1950] pp 994 999

1948

324 DIRINGSHOFEN H VON Das gesundheitliche Problem des Weltraumfl ges das Fehlen de Schwerkraft [He lth problem of space fl ght ab nce f grav ty] *G en geb med* 1948 I 144 145

COSMIC RADIATION

1958

325 LEAVITT W Cosmic radiation—how much of a barrier *Air Force* 1958 41 52 55 (Oct No 10)

325a SANDEMAN T F Cosmic radia ion and i s possible biological effects *Spaceflight* 1958 1 291 296

326 TOBIAS C A. Radiation hazards in space flight 52 pp (University of California Radiation Labora ory UCRL-8115 January 1958)

327 TOBIAS C A. and others A summary of the Berkelev conference on biological effects of cosmic rays and accelerated heavy ions 14 pp (University of California Radiation Laboratory UCRL-8201 Mar 10 1958) "In this report we are primarily concerned with cosmic rays as a potential hazard to space travel " p 5

1957

328 EUGSTER J Zur biologischen Wirkung der Kosmischen Strahlung (KS) in grossen Höhen [On the biological effect of cosmic radiation at high altitude] *Raketen.echnik u. Raumfahrtforsch* 1957 1 71-72

329 GRAUL E H Radiobiologische Probleme de Raumfahrt [Radiobiological problems of space flight] *Raketentechnik u. Raumfahrtforsch* 1957 I 40 47

330 SHEPHERD L R Cosmic radiation and space flight In *Bates D R.* (editor) *Space research and exploration.* London Eyre 1957 pp 71 85 American edition N Y William Sloane Associa.es 1958 pp 84-102

331 SHEPHERD L. R. The possibility of cosmic-ray hazards in high altitude and space flight *J Brit Interpl Soc* 1953 12 197 212. Also in CARTER L J (editor) *Realities of space travel.* London Putnam 1957 pp 231 250

332 SIMONS D G Effetti biologici delle radiazioni cosmiche primarie [Biological effects of primary cosmic radiation] *Riv med aeronaut* 1957 20 47 75 (Supple to No I Jan Mar) Polyglot summaries

333 STEINMETZ C H Techniques used for monitoring biological specimens on the 1954 and 1955 Aero Medical Field Laboratory balloon flights iii 11 pp (Holloman Air Development Center Technical Note HADC TN 57 1)

1956

334 CHASE H B and POST J S Damage and repair in mammalian tissues exposed to cosmic ray heavy nuclei *J Aviat M.* 1956 27 533-540

335 EUGSTER J A G and others Effects on living tissue by pri mary cosmic ray particles 21 [13] p (Air Force Office of Scientific Research Tr 56-19 February 1956)

336 GOLDEN A and SCHAEFER H J Microphocal alpha irradiation as a means of simulating exposure to heavy nuclei of the primary cosmic radiation *J Aviat Med* 1956 27 322 327

337 HARLOW H F and others Exposure of primates to cosmic radiation above 90 000 feet *J Comp Physiol Psych* 1956 49 195-200

338 HAYMAKER W Operation stratomouse *Mil Med* 1956 119 151 171

339 KAPLAN J and KALLMANN H K Progress in upper atmosphere physics during the last decade *J Aviat Med* 1956 27 345 355

340 SCHAEFER H J Optimum altitudes for biological experimentation with the primary cosmic radiation *J Aviat Med* 1956 27 512 521

341 SIMONS D G and PARKS D P Improved techniques for exposing animal to primary cosmic ray particles *J Aviat Med* 1956 27 317 321

342 SIMONS D G and STEINMETZ C H The 1954 Aeromedical Field Laboratory balloon flight physiological and radiobiological aspects *J Aviat Med* 1956 27 100-110

343 SINGER S F Cosmic ray effects on matter at high altitudes *J Aviat Med* 1956 27 111 116

344 YAGODA H Frequency of thin down hits by heavy primary nuclei in emulsion and tissue *J Aviat Med* 1956 27 522 532

1955

345 CAMPBELL B Research on the biological effects of the heavy particle cosmic rays iii 13 pp (Holloman Air Development Center HADC TR 55 8 December 1955)

346 CHASE H B and others Effects on the skin by cosmic ray heavy particles iii 7 pp (Holloman Air Development Center HADC TR 55 2 May 1955)

347 EUGSTER J Demonstration über den Nachweis der kosmischen Strahlung im menschlichen Korper [On the determination of cosmic radiation in the human body] In HECHT F (editor) Bericht über den V Internationalen astronautischen Kongress Innsbruck 5-7 Aug 1954 Wein 1955 pp 188 189 Abstract Exposed tissue transplanted to observe latent effects of radiation

348 EUGSTER J Ueber den Nachweis von schweren Primaren der kosmischen Strahlung mittels einer Farbstoffmethode [Demonstration of heavy primaries of cosmic radiation by means of a dye] *Astronautica Acta* 1955 1 57-60

349 EUGSTER J *Weltraumstrahlung* Bern Huber [1955] 141 pp

350 SCHAEFER H J Biological significance of the natural back ground of ionizing radiation observations at sea level and at extreme altitude *J Aviat M.* 1955 26 453-462

351 SCHAEFER H J Graphs and tables for the hit frequencies from heavy nuclei of the primary cosmic radiation III Statistical variation of hit frequencies in a population of exposed specimens iv 14 4 pp (U S Naval School of Aviation Medicine Pensacola Florida Research report No NM 001 101 100 10 11 Fe 1955)

352 SCHAEFER H J Graphs and tables for the hit frequencies from heavy nuclei of the primary cosmic radiation IV Iso-intensity charts for high-energy heavy nuclei within a standard sphere (man) iii 17 11 pp (U S Naval School of Aviation Medicine Pensacola Florida Research project No NM 001 101 100 report No 11 20 Dec 1955)

353 SCHAEFER H J Protection of humans from heavy nuclei of cosmic radiation in regions outside the atmosphere *Astronautica Acta* 1955 1 100-109

1954

354 BIRGE, A C Laboratory studies for evaluating the biological effects of primary cosmic radiation *J Aviat M.* 1954 25 326-330

355 CAMPBELL B A biological study of the effects of the heavy particle component of cosmic rays *J Aviat M.* 1954 25 361 365

356 CHASE H B Cutaneous effects of primary cosmic radiation *J Aviat M* 1954 25 388 391 427

357 HAIG T O Plastic balloons for high altitude research *J Aviat M* 1954 25 351 353

358 KREBS A T Techniques of biological measurements of low level radiation *J Aviat M.* 1954 25 331 337 353

359 SCHAEFER H J The cross section for thin-down hits from heavy nuclei of the primary cosmic radiation in biological experimenta tion 17 [6] pp (U S Naval School of Aviation Medicine Pensacola Florida Research report No NM 001 059 13 07 12 January 1954)

360 SCHAEFER H J Definition of a permissible dose for primary cosmic radiation *J Aviat M* 1954 25 392 398 411

361 SCHAEFER H J Graphs and tables for the hit frequencies from heavy nuclei of the primary cosmic radiation I Hit frequencies for small specimens (drosophila plant seeds etc) 9 [3] pp (U S Naval School of Aviation Medicine Pensacola Florida Research report No NM 001 059 13 08 10 June 1954)

362 SCHAEFER H J Graphs and tables for the hit frequencies from heavy nuclei of the primary cosmic radiation II Hit frequencies for spherical targets of 2 to 5 centimeter diameter (small mammals) 6 [4] pp (U S Naval School of Aviation Medicine Pensac da Re search report No NM 001 059 13 09 4 August 1954)

363 SIMONS D G Methods and results of one year of balloon flights with biological specimens *J Aviat M* 1954 25 380 387

364 SIMONS D G Stratosphere balloon techniques for exposing liv ing specimens to primary cosmic ray particles v 67 pp (U S Hollo man Air Development Center HADC TR 54 16 November 1954)

365 STORER J B and others Specific ionization and relative biological effectiveness of ionizing radiations in mammalian systems application to problem of co mic ray hazards *J Av at M* 1954 25 368 377

366 YAGODA H and SMITH H B Observations on the penetration of a heavy pr mary through ti ue *J Aviat M* 1954 25 46 49 66

1953

367 EUGSTER J Methods for demonstrating the biological effective ness of cosmic radiation at high alt tudes *J Aviat M* 1953 24 222 226 Biologic amples tested at 30 000 meters

368 EUGSTER J Zur Untersuchungstechnik der Erforschung der biologischen Wirkung der kosmi ch n Strahlung in grossen Hohen [Re search technic for the investigation of the biological effect of cosmic radiation at high altitudes] In *Space fl ght problems* being a complete collection of all lectures held at the Fourth Astron utical Congress Zurich 1953 Biel Laub cher [1953] pp 203 205

369 GASPA P Le rayons cosmiques effets physio pathologiques sur l homme [Co mic rays phy io pathological effects on man *Meteorologie* 1953 No 32 Oct Dec pp 261 271

370 SCHAEFER H J Cosm c radiation an evaluation of present d y knowledge of cosmic radiation at extreme altitude in terms of the haz ard to health *Pacific Rocket Soc Bull* 1953 6 Sect B pp 1 6 (No 1 Jan 10) Sect B pp 1 5 (No 2 Feb 10) Sect B pp 1-6 (No 3 Mar 10) Sect B pp 1 8 (No 4 April 10)

371 [SCHAEFER H J] Space travel menace *Sci News Lette* 1953 63 323 Cosmic rays

372 SCHAEFER H J Theory of protection of man in the region of the primary cosmic radiation *J Aviat M* 1954 25 338-350 Revision of Theory of protection of man in the region of the prim ry cosmic radiation U S Naval School of Aviation Medicine Pensacola Fla (Project No NM 001 059 13 06 5 August 1953)

373 SCHAEFER H J and STUHLINGER E The rate of energy loss (REL) in the terminal section of heavy nuclei tracks in living tissue 10 [7] pp (U S Nav l School of Aviation Medicine Pensacola Florida Project No NM 001 059 13 05 11 March 1953)

374 SHEPHERD L R The possibility of cosmic ray h zards in high altitude and space flight *J Brit Interpl Soc* 1953 12 197 212 Also in CARTER L J (editor) *Real ties of space travel* London Putnam 1957 pp 231 250

1952

375 EUGSTER J Die biologische Wirkung der kosmischen Strahlung Methoden und neueste Ergebnisse [Biological effect of cosmic radia tion methods and most recent results] In KOLLE H H (editor) *Probleme aus der astronautischen Grundlagenforschung* (Vorträge gehalten anlässlich des III Internationalen Astronautischen Kongresses in Stuttgart vom 1 bis 6 September 1952) Stuttgart Gesellschaft fur Weltraumforschung 1952 pp 211 [18]

376 EUGSTER J Methode zum Nachweis der biologischen Wirkung der kosmischen Strahlung in grossen Höhen [Methods for demonstrating the biological effect of cosmic radiation at high altitudes] *Weltraumfahrt* 1952 3 42-46

377 GASPA P Les rayons cosmiques et leur effets biologiques sur l aviateur [Cosmic rays and their biological effects on aviators] *Med aeronaut* 1952 7 187 194

378 SCHAEFER H J Exposure hazard from cosmic radiation at ex treme altitude and in free space In KOLLE H H (editor) *Probleme aus der astronautischen Grundlagenforschung* (Vorträge gehalten anlässlich des III Internationalen Astronautischen Kongresses in Stuttgart vom 1 bis 6 September 1952) Stuttgart Gesellschaft für Weltraumforschung 1952 pp 201 210 Also *J Amer Rocket Soc* 1952 22 277 283

379 SCHAEFER H J The radial spread of the tissue ionization in heavy nuclei tracks of the primary radiation 10 [9] pp (U S Naval School of Aviation Medicine Pensacola Florida Project No NM 001 059 13 04 5 August 1952)

380 SCHAEFER H J Exposure hazards from cosmic radiation be yond the stratosphere and in free space 9 pp (U S Naval School of Aviation Medicine Pensacola Fla Proj No NM 001 059 13 03 31 March 1952) (Also with a different conclusion and the addition of graphs) *J Aviat M* 1952 23 334-344 401

381 TOBIAS C A Radiation hazards in high altitude aviation vii 36 pp (USAF Wright Development Center WADC Technical report 52 119 May 1952) Also (with minor variations) *J Aviat M* 1952 23 345 372

1951

382 BUETTNER K Radiation effects on man in space *Bull Amer Met Soc* 1951 32 183-185 Also in USAF School of Aviation Medi cine Randolph AFB Texas *Epitome of space medicine* (Item 13)

383 SCHAEFER H J The diurnal intensity variation of the primaries of cosmic radiation and its consequences for the hazard to health in flight at extreme altitudes *J Aviat M* 1951 22 351 357 To 140 000 ft

384 SCHAEFER H J Further evaluation of cosmic radiation in terms of hazards to health 20 [3] pp (U S Naval School of Aviation Medicine Pensacola Fla Project No NM 001 059 13 02 15 August 1951) This report summarize all data on the heavy nuclei component *which have appeared in the literature between Jan and Dec 1950*

1950

385 KREBS A T The possibility of biological effects of cosmic rays in high altitudes stratosphere and space 21 pp (U S Army Medical Dept Field Research Laboratory MDFRL Project No 6 64-12 08 (7) 28 April 1950) Also *J Aviat M* 1950 21 481 494

386 SCHAEFER H J Evalu tion of present day knowledge of cos mic radiation at extreme altitude in terms of the hazard to health *J Aviat M* 1950 21 375 394 418 Also U S Naval School of Avia tion Medicine Pensacola Fla Project NM 001 059 13 01 April 30 1950

NUTRITION IN SPACE FLIGHT

1958

387 ADAMS C C Nutrition in space flight *Missil s and Rockets* 1957 2 105 107 Italian translation *R v a ronaut* 1958 34 1027 1032

388 Feeding men during space flights c ntribut ons to the session on space feeding eighteenth nnual meeting of the Institute of food technologists Chicago May 28 1958 *Food Technology* 1958 12 429 463 Contents HANSON S W F Some observations on the problems of pace feeding pp 430 432 GAUME J C Nutrition in pace oper tion pp 433 435 SIMONS D G Nutr tion in pace flight balloon flight experience p 436-441 TAYLOR A A Present capa bilities and future needs for sp ce feeding pp 442 444 FINKELSTEIN B Feeding crews in air vehicles of the future pp 445 448 BROCK MAN M C and others Closed cycle biological systems for space feeding I Systems 1 and 2 [II System 3] pp 449 458 HOSGSON J G and TISCHER R G Space feed ng problems a b bliography pp 459 463 Also issued as a 36-page separate by the Institute

1957

389 KOOISTRA J A Jr and HARRIS N O Met bolic studies with lactobacillus under certain space flight conditions 4 leaves (U S School of Aviation Medicine Randolph AFB [Report] 58 39 December 1957)

SURVIVAL PROBLEMS

1958

390 REICH H Laboratory for space re arch *Ast ona tics* 1958 3 37 38 78 79 Report on high vacuum chamber and full pressure suit research

391 Space age research on Mt Evans Colorado *Med Tech Bull* 1958 9 185 190 On acclimatization to altitude and other physical requirements for the spaceman Dr BRUNO BALKE was in charge of the research

1956

392 BEISCHER D E and BORN S The boiling phenomenon of living tissue at low atmospheric pressure ii 12 pp (U S Naval School of Aviation Medicine Pensacola Florida Research project No NM 001 103 100 report No 1 9 July 1956) Also J Aviat M 1957 28 154 160

393 WARD J E The true nature of the boiling of body fluids in space *J Aviat M* 1956 27 429 439 Also in USAF School of Medicine Randolph AFB Texas *Epitome of space medicine* (Item 33)

1955

394 HITCHCOCK F A and KEMPH J The boiling of body liquids at extremely high altitudes *J Aviat M* 1955 26 289 297

395 JEFFRIES M R H Elements of space suit design *J Camb Univ Interpl Soc* 1955 1 25 27 (Je)

396 PAUL M C A method of sealing and gas conditioning an orbital survival suit *J Brit Interpl Soc* 1955 14 300 306

1954

397 BLOCKLEY W V and others Human tolerance for high temperature aircraft environments *J Aviat M* 1954 25 515 522

398 LOEB M and others A preliminary investigation of the effects of whole body vibration and noise i 17 11 pp. (U S Army Medical Research Laboratory Fort Knox Ky Report No 145 12 November 1954)

399 University of Michigan Engineering Research Institute Reference sources in the physiology of extreme environmental temperatures By W H FENNINGS and others iii 59 pp (Engineering Research Institute project 2167 2 P May 1954) (Department of the Army contract No DA 20 018 ORD 13146)

400 WEISS H H The physiology of simple tumbling Part 2 Huma.. studies v 20 pp (USAF Wright Air Development Center WADC technical report 53 139 Ja 1954)

1953

401 HABER F Escape and survival at high altitude iii 11 p (USAF School of Aviation Medicine Randolph Field Texas Proj No 21 1207 0006 September 1953) Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item

402 HABER F and CLAMANN H G Physics and engineering of rapid decompression A general theory of rapid decompression 29 pp (USAF School of Aviation Medicine Randolph Field Texas Project *No 21 1201 0008 Report No 3 August 1953*) *Also in USAF School* of Aviation Medicine Randolph AFB Texas *Epitome of space med cine* (Item 6)

1952

403 HABER F Bailout at very high altitudes *J Aviat M* 1952 23 322 329 200 000 400 000 ft Also in USAF School of Aviation Medicine Randolph AFB Tex *Epitome of space med c e* (Item 19)

404 HABER F and STRUGHOLD H Physik und Phy iologie des Drucksturzes im weltraum [Physics and physiology of explosive de compression in space] *Weltraumfah t* 1952 3 118 120

1950

405 HABER F On the physical process of explosive dec mpression 7 pp (USAF School of Aviation Medicine Randolpl Field Texas October 1950) Special report Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medi ne* (Item 1)

406 ROSS H E Lun r pacesuit *J Br t Interpl Soc* 1950 9 23 37 See also letters regarding this ar ticle *Ibid* 258 259 300 302

PSYCHOLOGIC AND SOCIAL PROBLEMS

1958

407 BURROWS A Psychological stress in p ce trav l *New Sci entist* 1958 3 pp 12 14 (No 75 24 Ap)

408 CLARK E USAF simulates sp ce crew condit ons *Aviat Week 1958 68 pp 51 53 55 57 59 63 (No 18 May 5) Wright Air* Development Center confinement studies described

409 HENRY J P Psycho physiological hazards of satellite flight In Royal College of Aeronautics London *High altitude and satellite rockets* a symposium held at Cranfield Engl nd 18th 20th July 1957 Published jointly by the Royal Aeronautical Society [and] the British Interplanetary Society London 1958 pp 107 110 and *Joint disc s s on* pp 111 114

410 MICHAEL D N How to keep space crews content *M ssiles and Rockets* 1958 3 110 112 114 (No 4 Ap)

411 New York Academy of Sciences Man in space a tool and pro- *gr m for the study of social ch nge A n. N York Acad Sc* 1958 72 165 214 E pec ally LASSWELL H D Me in space pp 180 194 Selection nd traini g of p rs nnel pp 181 188

412 SELLS S B and BERRY C A Human requirements for space travel 30 [1] pp Randolph AFB Texas School of Aviation Medicine, 9 Fe 1958

413 Work helps man endure space isolation *Aviat Week* 1958 68 pp 37 39 43 45 47 (No 11 Mar 17) Research at School of Avia tion Medicine and Wright Air Development Center described

1957

414 BEYER D H and SELLS S B Selection and training of personnel for space flight *J Aviat M* 1957 28 1 6 Also in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space medicine* (Item 35)

415 WILCOX E J Psychological consequences of space travel *J Brit Interpl Soc* 1957 16 7 10 See also the following letters to the editor regarding this article BRODNEY P J Sociological as pects of space travel and SLATER E T O Psychological con sequences of space travel *Ibid* 173 176

1950

416 AMICO G V Preface to space flight synthetic training U S Office of Naval Research *Research Reviews* 1955 Nov pp 15 20

417 SLATER E T O Psychological problems of space flight *J Brit Interpl Soc* 1950 9 14 18 (Jan)

GROUND CREW PROBLEMS

1958

418 KROP S Medical problems in handling of rocket fuels In Aviation Medicine symposium United States Air Force Aviation Med icine Residency Program Toxic hazards in military flying and in the aviation industry 6 7 November 1957 Headquarters Air Materiel Command Wright Patterson AFB Ohio pp 41 44

419 SCHECTER W H Toxicity of high energy fuels poses hazards for handlers *Missiles and Rockets* 1958 3 85 86 (No 4 Ap) On toxicity of boranes

420 STUMPE A R Health hazards of new aircraft and rocket pro pellants a review of the literature *J Aviat M* 1958 29 650 659

1957

421 U S Department of the Army Health hazards from propellant fuels and oxidizers 12 pp (TB Med 242 Nav Med P 5035 AFP 160 6-3 21 June 1954) Change 1 26 Fe 1957 3 pp [Hydrazine and UDMH]

1954

422 KROP S The toxicity and health hazards of rocket propellants *Jet Prop* 1954 24 223 227 236

1952

423 OWSTON J Rocket propellants their toxic effects hazards and first aid *J Roy Army M Corps* 1952 98 157 169

EXTRATERRESTRIAL ASPECTS

1958

424 STRUGHOLD H Geographie des Weltenraumes Spatiographie *Welt aumfabrt* 1958 9 65 68

425 WHITE M S The aeromedical realities of space travel *J Aviat M* 1958 29 707 715

1957

426 STRUGHOLD H The ecosphere in the sol r planetary system In Proceedings of the VIIth Inte national Astronautical Congress (Rome 17 22 Sept 1956) Rom Associazione It liana Razzi 1956 pp 277 288 In Italian *Riv m d ae onaut* 1957 20 3 16 (Suppl to No 1 Jan Mar)

1956

427 STRUGHOLD H The oxygen belt in the planetary system *J Astrona tics* 1956 3 27 28 52 Also in USAF School of Aviation Medicine Randolph AFB Texas *Ep tome of space medicine* (Item 30)

1955

428 STRUGHOLD H The eco phere of the sun *J Aviat M* 1955 26 323 328 Also In USAF School of Aviation Medicine Ra dolph AFB Texas *Epitome of spa e medi ne* (Item 27)

429 TIKHOV G A Is life possible on other planets? *J B t As t onomical Assoc* 1955 65 193 204

1954

430 JONES H S *Life on otbe wo lds* 2d ed rev New York Macmillan 1954 259 pp

431 RICHARDSON R S *Man a d the pla ets* London Muller 1954 188 pp

1953

432 STRUGHOLD H Comparative ecolog cal study of the chemistry of the planetary atmospl eres *J Aviat M* 1953 24 393 399 464 Also (witl mi or om ssions d v riations) USAF School of Avi tion Medicine Randolph F eld T xa Spec al Report Dec mber 1953 iii 6 pp Al o in USAF School of Aviation Medicine Randolph AFB Texas *Epitome of space med cin* (Item 8)

433 STRUGHOLD H Da Leben auf dem Mars [Life on Mars] *Welt ra mfab t* 1953 4 24 26

434 STRUGHOLD H *The green and red planet* a physiological study of the possibility of life on Mars Albuquerque Univ of New Mexico [1953] xvii 107 pp

435 TIKHOV G A Astrobiologiya Moscow 1953 68 pp

1952

436 STRUGHOLD H Ecological aspect of planetary atmospheres with special reference to Mars *J Aviat M* 1952 23 130 140 Also in USAF School of Aviation Medicine Randolph AFB Texas *Epit ome of space medicine* (Item 17)

437 TIKHOV G A Astrobiologiya *Tekhnika Molodezhi* 1952 20 23 27 (No 11 Nov)

1951

438 STRUGHOLD H Life on Mars in view of physiological prin ciples 8 pp (USAF School of Aviation Medicine Randolph Field Texas Special report March 1951) Also *Tech Data Dig* 1951 16 15 19 (Nov) Also in USAF School of Aviation Medicine Ran dolph AFB Texas *Epitome of space medicine* (Item 3)

439 TIKHOV G A Novaya nauka astrobiologiya [New science astrobiology] *Nauka i Zhizn* 1951 18 15 18 (No 11 Nov)

1950

440 NYE E R The possibility of potentially pathogenic organ isms occurring on another planet *J Brit Interpl Soc* 1950, 9 62 63 See also letter taking issue with Nye *Ibid* 254 255 and Nye s reply *Ibid* p 302

1932

441 SCHACHNER N Can man exist on other planets? *Bull Amer Interpl Soc* 1932 No 15 Ja pp 3 10

OTHER BIBLIOGRAPHIES

1958

442 BENDIG A W *Supplemental bibliography on space medicine* 6 leaves Pittsburgh Dept of Psychology Univ of Pittsburgh, Sept 15 1958 63 references mainly on behavioral effects of acceleration and deceleration

443 BENTON M Earth satellites guided missiles rockets and space flight a bibliography of books and periodical articles *Wilson Library Bull* 1958 32 412 419 No specifically medical references listed

444 HENDRICKSON R M *Bibliography on space medicine* Los Alamos Los Alamos Scientific Laboratory Libraries 1958 20[illegible] typewritten references on single sheets assembled in a

Author states References consulted Index Medicus 1940 June 1955 Current List of Medical Literat re July 1955 1957

445 U S Army Library *M litary aspects of space explorati n* a sel cted list of titles iv 55 pp (Its Special bibliography No 16 5 June 1958) E vironmental factors and problems pp 34 42

1954

446 KOELLE H H and KAEPPELER H J (editors) *L teratur verzeichn s de Astronautik* [Literature Index of Ast onautics] Titt moning Walter Pustet [1954] 100 pp Physiologie p 44 Medizin p 44 47

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THE PHYSICIAN IN A TROUBLED WORLD

Perhaps the most deadly form of conformity as applied to doctors is the widespread belief that a man of medicine must be isolated from the affairs of the world Medicine must always deal not simply with disease but with the whole man in relationship to society for man cannot long remain healthy in an unhealthy society The great men of medicine have all been outstanding as intellectuals as philosphers or in other ways one needs only to read the writings of Sir William Osler and Oliver Wendell Holmes to realize this truth once again Even Rudolf Virchow father of cellular pathology left his microscope long enough to write People must feel that they belong together not on account of a common ancestry which they perhaps do not have but on account of a spirit in which they live together What better credo could be laid down in these troubled times when the nations of the world must stand together for peace or fall separately into oblivion?—Frank G Slaughter The Danger of Agreeing *The Journal of the Florida Medical Association* December 1958

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Clinicopathologic Conference

Fitzsimon Army Hospital
D C l d

CHEST PAIN

Summary of Clinic l History \ 22 year old man was admitted to this hospital by transfer from Germany complaining of pain in the right lateral part of his thorax radiating posteriorly and inferiorly

The patient had been in good health until three months earlier when he experienced a sudden onset of pain in the right lower lateral part of his chest which radiated through to the back and downward Onset occurred while at rest and was unassociated with trauma or excessive exertion The pain was made worse by deep or forceful respiration but was somewhat relieved by sitting up and bending forward The patient felt feverish at the onset but did not have a chill Cough sputum hemoptysis dyspnea and gastrointestinal and urinary complaints were absent He was unaware of substernal compression pain in his arms or palpitation After outpatient treatment for six days had yielded no improvement he was admitted to a hospital where a roentgenogram of the chest suggested right sided pleural effusion with a fluid level at the seventh rib posteriorly and slight left displacement of the mediastinum Expectant treatment failed to produce significant improvement Three weeks later a repeat chest film showed the entire right lower lung field to be obscured by fluid and thickened pleura which appeared limited by the horizontal fissure 1 000 ml of thick blood tinged cloudy brown fluid with fibrin clots were removed from the right side of the chest without difficulty and 60 ml of air were injected A roentgenogram which followed was reported to show an air and fluid level in the right lower lung field bounded superiorly by dense pleural thickening and com

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pressed lung tissue suggesting a walled off effusion not communicating with the overlying lung. While hospitalized over six the patient's symptoms changed but little except that he appeared chronically ill, toxic and apathetic and lost 52 pounds in weight. Fever was mild but continuous, varying from 98° to 100.5° daily.

At the time of transfer a systemic review disclosed no additional information.

Past history included the usual childhood illnesses. One year prior to the onset of the present illness he was treated for chancroid in Germany. Incision and drainage of inguinal lymph nodes was performed and sulfonamide therapy was instituted, resulting in prompt healing without sequelae. There had been no further illnesses, injuries, or operations.

The patient's immediate family was alive and well. The patient knew of no contacts with tuberculosis. Familial diseases were specifically denied. He was a native of Alabama and had lived most of his life on a farm. He enlisted in the Service at age 18 and had served continuously since, with duty at a number of stations in the southeastern United States, California, the Far East and Europe.

Physical Examination. On admission the patient appeared to be chronically ill, debilitated, and toxic. His temperature was 101° F., pulse rate 90 per minute, respirations 25, and his blood pressure was 110/70 mm. Hg. There was moderate pallor of the conjunctivas and nail beds. The head and neck were essentially negative. There was no palpable lymphadenopathy. There was respiratory lag to expansion over the right lower part of the thorax. No tactile fremitus was elicited in this region. The percussion note was dull up to the level of the sixth vertebra posteriorly on the right and to the fourth interspace anteriorly. Breath sounds were diminished over this area, and there were scattered inspiratory and post-tussive rales. The heart was not enlarged and no mediastinal displacement was suggested. The abdomen was full and soft but slightly distended. A smooth liver margin was questionably palpable at the costal margin. There was vague, ill defined abdominal tenderness, particularly in the right upper and lower quadrants. Bowel sounds were hyperactive but of normal quality. Rectal, genital, and neurologic examination findings were normal.

Laboratory Studies. The red blood cell count ranged from 3,900,000 to 4,100,000 per c.mm., and the hemoglobin varied from 9.1 to 10.2 grams per 100 c.c. There was no anisocytosis, and the red cell morphology showed slight hypochromia. The white blood cell count ranged from 11,000 to 14,000 per c.mm. with no striking differential of 70 per cent neutrophils, 2 per cent basophils, 2 per cent monocytes, and 2 per cent eosinophils. Platelets were adequate and no abnormal cells were found. The [illegible]



Clinicopathologic Conference

Fitzsimons Army Hospital
D C I d

CHEST PAIN

Summary of Clinical History A 22 year old man was admitted to this hospital by transfer from Germany complaining of pain in the right lateral part of his thorax radiating posteriorly and inferiorly

The patient had been in good health until three months earlier when he experienced a sudden onset of pain in the right lower lateral part of his chest which radiated through to the back and downward Onset occurred while at rest and was unassociated with trauma or excessive exertion The pain was made worse by deep or forceful respiration but was somewhat relieved by sitting up and bending forward The patient felt feverish at the onset but did not have a chill Cough sputum hemoptysis dyspnea and gastrointestinal and urinary complaints were absent He was unaware of substernal compression pain in his arms or palpitation After outpatient treatment for six days had yielded no improvement he was admitted to a hospital where a roentgenogram of the chest suggested right sided pleural effusion with a fluid level at the seventh rib posteriorly and slight left displacement of the mediastinum Expectant treatment failed to produce significant improvement Three weeks later a repeat chest film showed the entire right lower lung field to be obscured by fluid and thickened pleura which appeared limited by the horizontal fissure 1 000 ml of thick blood tinged cloudy brown fluid with fibrin clots were removed from the right side of the chest without difficulty and 60 ml of air were injected A roentgenogram which followed was reported to show an air and fluid level in the right lower lung field bounded superiorly by dense pleural thickening and com

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sulted from administration of albumin and protein hydrolysate Epigastric distention with hiccup, belching and excessive flatus were troublesome A short episode of diarrhea was controlled promptly with paregoric A septic fever up to 103°F daily oc curred over the terminal three weeks of illness and the course was one of progressive deterioration Clubbing of the fingers be came apparent during the latter part of the patient s illness During the last two weeks of his life he developed a cough pro ductive of purulent, greenish yellow sputum At this time breath sounds became tubular and tactile fremitus was elicited over the right lower lobe Whispered pectoriloquey was present and there were numerous inspiratory and expiratory rales Throughout hos pitalization the patient received penicillin, sulfonamides and streptomycin sulfate without improvement Death occurred qui etly during the third month following transfer

DISCUSSION

Doctor Phelps * I do not believe this case is primarily a chest prob lem I would like first to review the points in the protocol that I be lieve are important

The patient was stationed in the Far East Europe the southeastern part of the United States and California which means that he has been in almost all areas where many of the commoner chest conditions originate He had pain in the right lateral part of his chest radiating through to the back and downward which could be the result of disease in the chest or abdomen The pain was made worse on deep inspiration and relieved by sitting up and bending over This may be due to an abdominal lesion and is especially suggested by the latter He had no cough dyspnea hemoptysis or gastrointestinal or urinary complaints He was chronically ill toxic apathetic and had lost 32 pounds in weight He has a mild but continuous elevation in temperature He did not have chills

There was respiratory lag over the right thorax absent fremitus and dullness to percussion There was slight liver enlargement and ill defined abdominal tenderness especially in the right upper and lower quadrants Rectal examination was negative and I presume that this was adequately done so as to rule out appendiceal abscess or acute inflammatory process in the right lower quadrant

Laboratory data revealed a 3 300 000 to 4 100 000 red cell count and the hemoglobin varied from 9 5 to 10 2 grams per 100 ml This could go along with almost any kind of debilitating disease White blood cells numbered 11 000 to 13 000 per μl which would be considered only a slight elevation considering the degree of disease the individual had if it was an infection He had a differential count of 70 per cent neu trophils 25 per cent lymphocytes 3 per cent monocytes and 2 per

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M j H r y W Ph lp MC USA R sid nt Pulmon ry Dise ses

cent eosinophils This is almost normal The 2 per cent eosinophils would be inconsistent with echinococcal disease He had innumerable bacteriologic examinations all of which were negative This I think is very significant particularly since thick purulent material was aspirated from the pleural space Certainly if this were a bacterial infection it should have been fairly easy to distinguish by culture and smear His A/G ratio was inverted which would go along with almost any debilitating disease Liver function studies were almost normal

Bronchoscopy showed some mucopurulent exudate in the bronchial tree of the right lower lobe but was otherwise normal Thoracentesis was performed almost daily and the pleural fluid was almost the same as at first being thick brown material However after the patient had been on strict bed rest the fluid became clear and serous When he was again allowed to be ambulatory the material again became thick and purulent and he showed signs of reactivity of the disease He developed hiccups which were fairly persistent and would be caused by any kind of irritation of the diaphragm in that area He had a septic course terminally running a temperature of 102 F He had clubbing of his fingers Clubbing is most frequently seen in either carcinoma or an empyema and certainly after the patient's first tap he had an empyema He had a productive cough of purulent yellow sputum which persisted in spite of penicillin sulfonamides and streptomycin sulfate none of which apparently improved his condition

I think the revealing clue in this case is the nature of the fluid which came from the pleural space It is said to have been thick brown cloudy and was negative on smears and culture This would very well fit an amebic infection as do the other features of the case Amebic abscess of the liver is characterized by chronic illness with gradual and progressive weight loss low grade fever with rare chills pain in the right upper quadrant and if the diaphragm is involved there is pain on respiration There may be signs of consolidation of the right lower lobe with or without pleural effusion This often leads to the erroneous diagnosis of pneumonia empyema or tuberculous pleurisy The abscess frequently ruptures into the pleural space involves the lung and drains through the bronchus The liver edge is palpable and on pressure there is deep pain This patient had a peculiar type of tenderness over the liver and also dullness to percussion over the right lower lung field The diaphragm usually is elevated when an abscess is superior and involves the diaphragm The roentgenograms will be discussed later but on reviewing them I believe that the initial one reveals an elevation of the diaphragm which was mistaken for a fluid level

With multiple small abscesses the white blood cell count usually is elevated If the abscess is large there usually is only slight elevation If the abscess is larger the white blood cell count usually is lower This person had a relatively slight elevation of the white cell count If this correction is true we will assume he had a fairly large abscess The fluid of amebic abscess is thick semifluid chocolate brown in color and frequently has fibrin clots and debris Amebas are not

present in the necrotic content- of the cavity and therefore cannot be demonstrated in the fluid The organi ms are found in large numbers in the advancing wall The fluid usually is bacteriologically sterile In very large ab cesses the fluid is yellowish The larger the ab ce the more nearly the fluid become- clear This per-on was bringing up very large amounts of yellowish material through hi bronchus Fo ally the abscess had involved hi lung and wa draining throu,h the bron chus

Treatment of amebic ab see s con i t of emetine or chloroquine or both with repeated closed needle dr inage Open drainage ha a higher mortality rate This man had half the treatment n ely the drainage

My diagnosis in this case amebic ab ce of the liver involving the dia,hragm After needle tapping it invol ed the pleura the lung and eventually drained throu,h the bronchus

Dr eto Mo r In making the diagnc s of a sub phrenic abscess from a radiologic viewpoint there are two things we should recall The fir t is that the diaphragm hould be fixed and the second is a demonstra ion of an air fluid level below the diaphragm The first roer genogram dated 5 Augu t shows a density in the lower right side of the che t It ha a straight superior border not characteristic for a pleural effusion Infrapulmonary effusions may be present in this fashion apparently the original thought in this case As we progress throu,h several roentgenograms we note that in the one dated 25 August (fig I) an obvious air fluid level is seen in this density We must not immediately arrive at a diagnosis of subphrenic abscess as this ai might have been placed into an inf apulmonary effusion by a diag no tic or therapeutic thoracentesis At this point two procedures might prove helpful The fi st would be fluoroscopy in an attempt to localize the diaphragm and check for fixation A dia,nostic pneumo peritoneum might aid the fluoroscopist considerably Second a roent genogram of the chest taken with the patient in a right lateral decubitus position may show shift of pleural fluid above the diaphragm It is to be remembered that wi h subphrenic abscess we may have free pleural fluid in the form of a sympathetic effusion or an associated pulmonary inflammatory process

If a subphrenic abscess occurs on the left side we must distinguish this from the gastric air bubble This can be simply done by having the patient swallow a barium meal

In conclusion because this patient definitely manifested symptoms and signs of having a subdiaphragmatic abscess amebiasis deserves f t consideration The question of an infrapulmonary effusion cannot be entirely ruled out but in future cases the procedures discussed might prove helpful

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Mart J h G M r R dent a Ra l gy

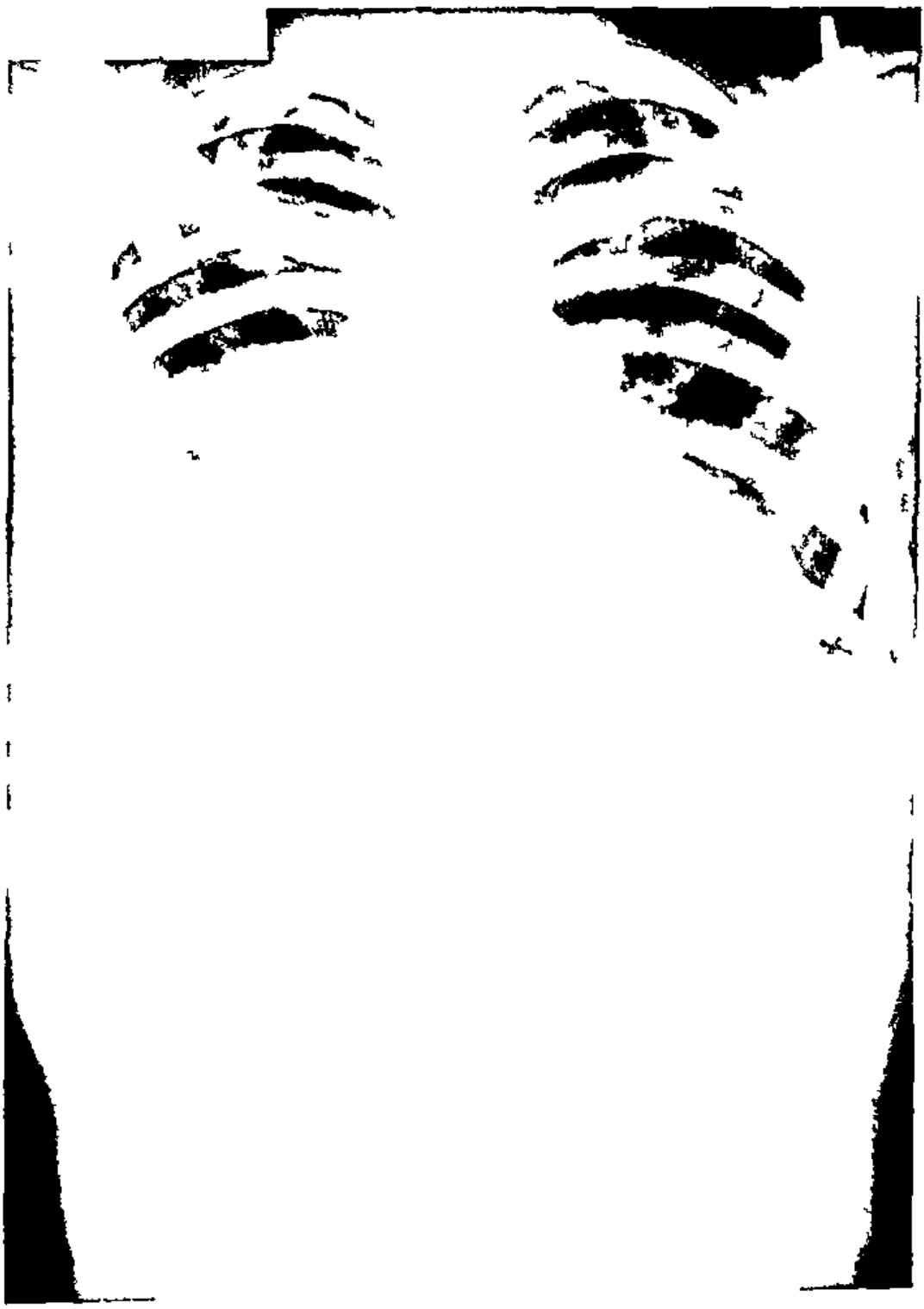


Figure 1. Roentgenogram showing massive fluid level

Dr Phelps discussis

1. Amebic abscess of liver with pleuropulmonary abscess following needle aspiration

Clinical diagnoses

1. Abscess of the liver chronic cause undetermined

2. Abscess subdiaphragmatic chronic cause undetermined

PATHOLOGIC FINDINGS

Doctor Hewbert The significant autopsy findings were related to the liver lungs and intestines The liver was enlarged (2 760 grams) but not distorted In the posterior superior portion of the right lobe was a solitary 14-cm abscess containing semifluid brownish-gray material There was a fairly well defined fibrous wall and the lining was haggy and granular The abscess was fused to the diaphragm to which there was a jagged 1 5-cm perforation extending into the overlying pulmonary substance The pleural pulmonary abscess was walled off by dense fibrosis and was surrounded by consolidated lung parenchyma No bronchopleural fistula was demonstrated and it is probable that the expectorated material was related to the pneumonitis

In the terminal ileum cecum and ascending colon were discrete and confluent jagged undermining mucosal ulcerations In addition there was a patchy fibrinous exudate over the serosa of the involved bowel In many places the wall was extremely friable and necrotic and there was a greenish-yellow membrane which suggested staphylococcal enteritis although we were not able to culture staphylococci from the bowel

Microscopic examination of the colonic ulcers the liver abscess wall and the right lower lobe of the lung revealed morphologically typical *Endamoeba histolytica* trophozoites

The present case is an excellent illustration of the pathogenesis and of some of the commoner clinical manifestations in amebiasis [2-4] Amebiasis results from infection by the protozoan *Endamoeba histolytica* which is an obligatory tissue parasite Transmission is by ingestion of material contaminated with the cyst form The trophozoites if they are contaminants are either destroyed rapidly by drying or if they are ingested they are destroyed by the gastric juice In the lower intestine the cysts break down, liberating trophozoites which invade the wall by means of proteolytic enzymes Further extent of the infection is determined by the host parasite relationship established Thus while numerous surveys show that about 10 per cent of the population of the United States harbor the parasite only a small number perhaps 10 per cent develop clinical disease which assumes various forms

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Capt Jam P Hewbert, MC Resident in Pathology

When significant numbers of lesions are present in the sigmoid and rectum dysentery occurs The commoner s te of localization in the bowel however is the cecum which probably accounts for the low incidence of symptoms in affected persons In the bowel trophozoites invade blood vessels (fig 2) and are disseminated to the various organs the most common by far being the liver As in our patient direct ex tension through the d aphragm (fig 3) from the liver abscess into the lung is not infrequent Less common is involvement of the bra n spleen and kidneys Organisms have been reported in practically every struc ture of the body

As has been emphasized probably the most important factor in es tabl shing the diagnosis is suspicion of the disease Diagnostic tools include stool exam nation culture and serologic tests The most frequently u ed and t present the most reliable method i ex mination of fresh stools for cysts and trophozoites w th typical morphology If en mas are used to obtain stool specimens oily enemas should be avoided If stools are examined immed ately trophozo tes may be found at times If examination of the stool specimen is deferred for any per od of t me it is be t to store the specimen n the refrigerator contrary to the oft n repeated adv ce to keep the specimen warm n an incubator The latter procedure accelerates the breakdown of tro phozoite whereas refrige at on slows this process and allows ex amination to take place several hour after obta ning the specimen After storage the spec men is of course warmed to induce motility Culture is a reliable method although t times it is techn c lly ather d ff cult and in the usu l case is not necessary Considerable work is being car ied on to develop serolog c tests but as y t none of these have been compl tely accepted or are completely satisfactory

In summary this c se is one of an essentially asymptomat c amebic leocolitis leading to liver abscess w th extension through the diaphragm and format on of a pleural pulm nary abscess Whether th s extension was spontaneous or followed needle tapping is not clearly established however the rad ologic evidence certainly appears to favor the latter The onset of symptoms apparently coincided with the involvement of the diaphragm Death resulted from the debilitating affects of the amebiasis complicated termin lly by pneumonitis and secondary bac terial infection of the bowel

Pathologic diag ses

1 Abscess right lobe of liver caused by *Endamoeba histolytica* with perforation of the diaphragm

2 Abscess lower lobe of right lung with organizing pneumonia caused by *E histolytica*

3 Colitis ulcerative *E histolytica*

A phy i i Why were no ameb s found n th asp r ted fluid?

D t V A k As M jor Phelps h s already remarked charac teristically mebas are not f und in the fluid of an amebic abscess but *are seen in the w ll around it When an b cess is asp rated* the chocol t brown color of th fluid w ll give an nd c tion as to wh t



Figure 2 Photomicrog aph of section of bowel wall showing invasion of blood vessel by trophozoites. (Approximately × 750)

vantage over emetine in that it is far less toxic and a much safer drug to use However in my opinion it does not bring about the uniformly good results that are obtained from emetine

Regarding the toxicity of emetine certainly this must be recognized The precautions prescribed for its use should be rigidly foll wed How ever many many treatments w th emetine were administered during World War II and relatively few disastrous results were reported So I do not hesitate to use emetine and in fact prefer it as the drug of cho ce for the tre tm nt of am bic abscess of the liver One often reads statements to the effect that drugs alone will cure an amebic abscess This has not been my experience Although it may b w rthy of tr al n the individual c se I prefer to have the abscess drained either by needle or open aspiration Open drainage has produced better results for me than has closed dr inage Thus on the basis of my ex per ence I would recommend the combination of emetine and adequate ev cuation of the abscess prefe ably by open drainage

D t S ly By and large I agree with the statements of Dr Powell I also w ll preface my remarks by st ting that it is difficult for me to reconcile the fact that this patient was observed in an instal l tion such as this and went on to a fatality without having the benefit of some ne making a tentat ve d ag osis f amebic abscess of the liver subphrenic space and compl cated further by the pleuropulmonary e t nsion to the r ght—an accompany ng and fairly common serious com plication of ameb as s as seen in years past A few day of so called empirical therapy with emet e and other ant amebic agent in vogue at that time would n this retrospect ve analys s m ght h been ind cat d May I also add that a surgeon or an internist well disci plined in the methods of needle aspiration could h ve been called n consultat on Now about aspirati n and/or urgical management A few years ago t was considered too d nger us because secondary pyogen c nfect on would often ensue and cause s bseq ent death of such patients in a h gh percentage of patients so tre ted In this era of f ne antimicrobial drugs and a sounder knowledge of electrolyte and nutrition problems as well as oth r refinements in supportive postop erat ve management I don t think we would hesitate in the least to explor such a patient surgically evacuate and unroof abscesses in the liver pleural space and the lung and instill the drugs that seem specific or of prophylactic value Closure or drain ge of pockets and spaces is always a decision that the surgeon must make at the operat ing table Of course I think we would all recommend that such a p tient receive specific drugs such as emetine and chloroquine f r th ee or f ur days prior to surgical management

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C l J hn M Saly MC Ch f Th Surg y Serv

REFERENCES

1 Ma k T T Hun G W III and W rth G B *A Manual f Trop al Med* m (Mil ry Med l Ma l N l R h Coun l) W B Saund Compa y Ph l d lph P 1945

2 Ash J E and Spitz S *Pathology of Tropical Diseases* An Aids Saunders Comp ny Philadelphia Pa 1945 pp 79 81
3 Seneca H Amebiasis review pathogenesis pathology and clin ca tions *Am J D gest Dis* 1 250 260 June 1956
4 Seneca H Amebia is re i w lab ratory d gn i different al diagn th rapy *Am J D gest Dis* 1 310 322 July 1956

DIARY OF SHIP S SURGEON—M y 22 1841

This morning at half past one I was roused ou r a most comfortable sleep by the second mate who info me that a woman was in labour I immediately dressed went forward and found Mrs Harford who had not expected to be confined for more than a fortnight on the poin being delivered or rather I may say delivered for the of the child had already escaped and the body immediatel followed She had been taken with labour pains about 10 evening before and the stupid people about her not only neglected to tell me anything about it but had not e made any preparations She was in a half standing po with all her clothes on supported by one woman in front while another was at work in the rear both of them in tremendous fuss and the poor patient yelling and groaning The child having made its exit just as I entered all that remained for me to do was to cut the navel string having put on two ligatures I then got the woman put to bed and gave her a little sherry and water After waiting for half an hour I proceeded to remove the placenta Passing my finger up I could feel the root of the umbilical cord, and part of the placenta in the vagina but the greater part appeared to be firmly grasped by the uterus and could not be removed by any moderate degree of force There were slight labour pains from time to time I made another attempt during one of these but was equally unsuccessful I therefore resolved to leave it to nature for a while to see what she would do and returned to bed at half past 3 About 7 I visited my patient once more the pains had almost entirely ceased and still the placenta was so firmly grasped that all my efforts to extract it were fruitless the pulse was rather weak I gave a little more sherry and water and 15 drops of the elixir of vitriol and an hour after 2 colocynth pill with a view to exciting the uterus to contract About midday there were some sharp pains I therefore made another attempt and at length with some difficulty succeeded in bringing it away entire The child a boy well grown and healthy looking —R F Wright St Clair Glimpses of Nine teenth Century Practice From the Diaries of Sir D Mint *The New Zealand Medical Journal* April 1958

Bilateral Consecutive Testicular Neoplasms

PAUL GONICK Capt USAF (MC)
JAMES M LANCASTER Capt USAF (MC)

THE first case of bilateral testicular neoplasm was reported by Livingston in 1805. Since then approximately 219 cases have been reported in the literature. Because of the rarity of this condition, the following case is reported.

CASE REPORT

The patient had an undescended testicle on the right first noticed at the age of 15 years. As an adolescent he was treated unsuccessfully with hormones by a private physician. At the time of his enlistment in the Army in 1952 no abnormality of the undescended testicle was noted. Medical attention was sought in June 1955 at a military hospital because of painful swelling of the right testicle. On examination this testicle was found to be enlarged, hard and located above Poupart ligament in the inguinal canal. An associated hernia was present. On 29 June 1955 the enlarged testicle was removed without biopsy.

Grossly the testicle was completely and smoothly encapsulated and was entirely replaced by a soft pinkish gray tissue with a smooth cut surface attaining large and small confluent nodules separated by pearly gray fibrous trabeculae. Microscopically the tumor was a pure seminoma of the testis with a granulomatous stroma. Occasional vessels within the tumor were invaded but no invasion of the coexisting structures was demonstrable. Physical examination and roentgenograms of the chest revealed no metastases.

X-ray therapy was instituted on 16 July 1955. In a period of 30 days 3,456 r were delivered to an area of skin 12 by 30 cm through anterior and posterior abdominal portals. Calculated tumor dose was 3,700 r to the paraaortic lymph nodes. The patient tolerated therapy well and sustained only a mild skin reaction.

He remained well until June 1957 when swelling of the left testicle was first noted. This gradually increased in size. In August 1957 while overseas he developed pain below the twelfth rib on the left that radiated into the left inguinal region. He was hospitalized on 7 August. Examination revealed the left testicle to be firm, enlarged to the size of an oblong orange and slightly tender. The mass did not transilluminate. No evidence of metastasis was demonstrated by physical examination, preoperative roentgenogram of the chest or by

From the USAF Hospital Lackland AFB Texas. Address reprint requests to Capt Gonick USAF Hospital Lackland AFB Texas. Submitted for publication 5 March 1958.

intravenous pyelography On 14 August the patient underwent testicular biopsy followed by a left radical orchiectomy

Gross description of the tumor is not available Microscopic sections showed anaplastic undifferentiated cells, foci of hair follicles and cells similar to notochord The cord structures were not involved The final pathologic diagnosis was teratocarcinoma with anaplastic seminoma

The patient was referred for a second course of x ray therapy Over a 46 day period he received a tumor dose of 2 100 r to the periaortic lymph nodes and 1 500 r to the pelvic nodes

The patient was re evaluated at this hospital from December 1957 through February 1958 Physical examination revealed pigmentation of the skin on the abdomen and back and well healed inguinal surgical scars Chorionic gonadotropins were less than 50 mg per 24 hour urine volume Intravenous pyelograms and roentgenograms of the chest were within normal limits The patient was asymptomatic at the time of discharge from the hospital

DISCUSSION

Of the 212 cases of bilateral testicular neoplasm reported in the literature, 40 cases were simultaneous tumors while the remainder occurred after the first tumor had been removed All cell types were represented except chorioepithelioma About one third of the bilateral simultaneous tumors were lymphomatous or sarcomatous [2]

Hamilton and Gilbert[9] reviewed the literature on bilateral testicular tumors and of the 126 cases in which definite histologic data were available, they classified 88 as "unicellular" 30 as teratomas, 4 as adenomas, 2 as interstitial cell tumors, and 1 each as adrenal cell carcinoma and spindle cell sarcoma They found that bilateral testicular neoplasms have been reported in an 8 month fetus and a 76 year old man Twenty five per cent of bilateral testicular tumors occur in men beyond the age of 50 [9] Of the remaining 75 per cent, more than half (40 per cent) occur in the 30 44 age group In Lewis [12] personal series of 250 tumors there was one case of bilateral seminoma in bilaterally abdominal retained testes

Two per cent (144 instances) of approximately 7,000 testicular neoplasms reported in the literature from 1805 to 1939, and reviewed by Hamilton and Gilbert[9] were bilateral They estimated that the general incidence of testicular tumors among men living in the United States is about 0 0013 per cent [13] The incidence of involvement of the second scrotal testis is 1 0 per cent in men who have had a testicular malignancy (more than 700 times the expected rate in the general male population) If the testicles are ectopic, the chances reach 15 per cent with inguinal cryptorchism and 30 per cent with abdominal cryptorchism Inasmuch as many patients die shortly after the appearance of their first testicular tumor and thus afford limited opportunity for later

development of a contralateral malignancy the tendency for bilateral testicular neoplasms is probably even more pronounced than indicated above

Because of this high incidence of malignancy in the remaining testicle, any patient who has had one testicular neoplasm must be closely followed Orchiopexy should be considered in the case of a remaining cryptorchid testicle in order to make it more readily available for examination

SUMMARY

The world literature contains reports of about 212 cases of bilateral testicular tumors All cell types seen in unilateral malignancy are reported bilaterally except for chorioepithelioma About 2 per cent of all testicular neoplasms reported are bilateral The possibility of the remaining testicle developing a neoplasm after one has been removed for malignancy is 1 in 100 in scrotal testis 15 in 100 in inguinal cryptorchids and 30 in 100 in abdominal cryptorchids All patients should be observed indefinitely following the removal of a testicle for malignancy Orchiopexy should be given serious consideration if the remaining gonad is cryptorchid A case of a seminoma followed in two years by a teratocarcinoma in the other testicle is presented

REFERENCES

1 Li g J C f f b th l wh h m d f ur bly by p rv f g ry *Ed nburgh M. & S J* 1 163-165 1805 C d f 2
2 Ab h B S T g A. d G ldf b M B l l um f t l w f l ur d p rt f f b l t l m l lymph rc m *J Ur L* 74 522-532 O t 1955
3 Ard L J d Sol O M B l l i l mn m f cr l *J Ur l* 77 47 50 J 1957
4 Col m P N d M K w K C. Ca f b l t l t l t m m m f t t w h t m h *Brit J Surg* 42 219-221 Sept 1954
5 Dod A I d H p J W J B l l m m m *J Urol* 72 424 427 Sept 1954
6 G rv y F K d D l T B B l t l t tt l ll t m f l *J Ur L* 66 713-719 N 1951
7 G ll R D d H w ll R B P m ry bil l l mo *J Ur L* 59 940-947 M y 1948
8 G R C d L w K B B l t l mbry l in m f t l th h q f h d ct my f m l g ant d *J Ur L* 47 482 490 Ap 1942
9 H m l J B (N w H C) d G lb rt J B S d m l g tum f t b l t l t l id ur d b n g p m ge- m t f p ti w th gl l *C ncer R* 2 125-129 F b 1942
10 H p J G M D w g S. B d N g m t G B l ral rc m f p rt f 3 *J Ur l* 71 634 638 M y 1954.
11 H hk R S. d L ry R B Co m b l t l m l g t t l tum *J Ur l* 63 1086-1092 J 1950
12 L w L G Cryp h m *New York J Med* 54 3078 3082 N 15 1954
13 G lbert J B d H m lt J B St d m l g t t t mo d d ur f um ct p c t *Surg Gyne & Ob t* 71 731 743 D 1940

Projectile Injury From Power Lawn Mower

DAVID W FURNAS *Captain USAF (MC)*

THE familiar power lawn mower is a potentially lethal source of injury Stones or similar objects thrown aside by the rotating blades can attain sufficient speed to inflict fatal wounds on bystanders Most individuals are cautious about direct injury from mowers but the hazard of indirect injury by projectiles is not commonly appreciated Stimulating public awareness of this danger, as well as the diagnosis and treatment of the injury, therefore, should be of concern to the physician

A serious injury sustained in this manner was recently treated in our hospital We are presenting here a resume of the clinical course to illustrate the problems that can be encountered

CASE REPORT

A 5 year old boy was watching an adult mow his lawn The boy stood several feet to one side of the mower so that he was facing the port from which the cut grass was expelled The mower blade made a sudden metallic report and the child immediately complained that something had struck his abdomen He ran home and his mother examined his abdomen She found what appeared to be a minor laceration of the abdominal skin Inasmuch as the child looked somewhat pale and acted peculiarly he was taken to the base hospital

Physical examination showed a moderately pale drowsy appearing child who responded to questions without difficulty A ragged 1 cm puncture wound was apparent several centimeters below the umbilicus and just to the left side of the midline Bowel sounds were slightly hyperactive The tonus of the abdominal wall was slightly increased A roentgenogram (fig 1) showed an irregular metallic density in the lower left quadrant

While in the x ray department the patient rapidly developed frank signs of shock Fluids and vasopressors were started blood was drawn for crossmatching purposes and the patient was taken to surgery immediately Laparotomy revealed 400 ml of fresh blood in the peritoneal cavity An irregular metal missile (fig 2) was found lying within a laceration of the posterior parietal peritoneum and adjacent to the iliac vessels but these structures were uninjured Ten perforations of the small bowel located in the ileum and lower jejunum and four in the mesentery were closed No major vessels were injured The patient was discharged from the hospital on the twelfth postoperative day

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From U S Air Force Hospital Holloman Air Force Base N M x

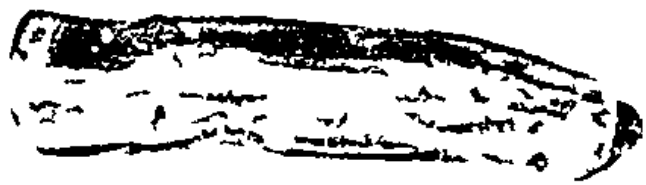
DISCUSSION

Objects thrown from the blades of a power hand mower are occasionally hurled with sufficient force to fit the classification of a deadly missile An average rotary power mower with a 20-



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inch blade turning over at 3500 rpm has a blade tip velocity of about 310 feet per second This is roughly one half the muzzle velocity of a 38 caliber revolver While mowing a lawn a good percentage of this velocity can be transmitted to any small ob ject At close range such a projectile is quite effective in in flicting injury to living tissue



F g M t l f agment m w g 3 8 by 0 8 m m d f m p t ent

We have encountered several injuries received in such a fashion at this facility Fortunately all the injuries have been of a minor nat re except the one reported The Ground Safety Division of

this base has been concerned about this hazard and has been active in warning base personnel

A power mower should be used so that bystanders are not placed in a vulnerable position, that is, they should not face the side from which the grass is thrown Commercial grass catchers are available that give some shielding to the mower and these would at least reduce the velocity of any projectile Before mowing a lawn, potential projectiles should be removed from the grass

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THE EPIDEMIOLOGY OF FLYING SAUCERS

Because actual experiments with flying objects such as planes vapor trails weather balloons parachutes missiles artificial satellites are constantly being carried on and some of these must be kept secret for security reasons the flying saucer has become a focal point a kind of goat for the highstrung and the fear ridden And to heighten the situation for the dramatically and mystically minded pictures and technical reports appear in newspapers from time to time Added to this the newsstands are in the midst of an avalanche of science fiction magazines and cheap books relating mysteries occurring in the vast interstellar regions In reality however not one saucer has been reported by any astronomical observation No moonwatch teams no camera no telescope reported any strange flying object Between 1947 and 1957 some 5700 reports have been examined by the air technical intelligence center with the same negative results Yet the epidemic of incredulous fantasies is going on —Joost A M Meerloo The Delusion of the Flying Saucer *American Practitioner Digest of Treatment* October 1958

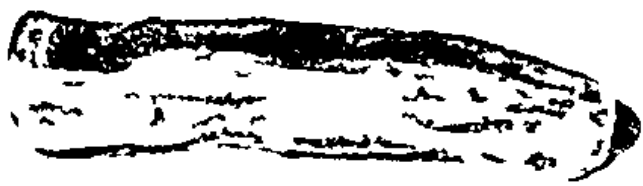
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OFFICER HEADS AERO MEDICAL ASSOCIATION MEETING IN LOS ANGELES, APRIL 27 29

Brigadier General M Samuel White USAF (MC) president of the Aero Medical Association has announced that more than 250 aviation and space bioscientists will present the results of their latest research and clinical achievements during the thirtieth annual meeting of the society at the Statler Hilton Hotel Los Angeles 27 28 and 29 April General White is director of staffing and education for the Air Force Surgeon General



Gene al White

The scientific program of the meeting arranged by a committee under the chairman ship of Brigadier General Don Flickinger USAF (MC) has selected for presentation a series of papers covering the biological aspects of flight from the standpoint of clinical and forensic aeromedicine basic research applicable to aviation medicine and the development testing and oper ational aspects of this specialty During most of the meeting scientific sessions will be conducted simultaneou ly in three large assembly rooms of the hotel Panels will be devoted to civil aviation medicine aviation pathology and accident prevention and space bioscience and technology Other sessions will be held on acceleration biomechanics dis orientation human engineering psychophysiology and weightlessness

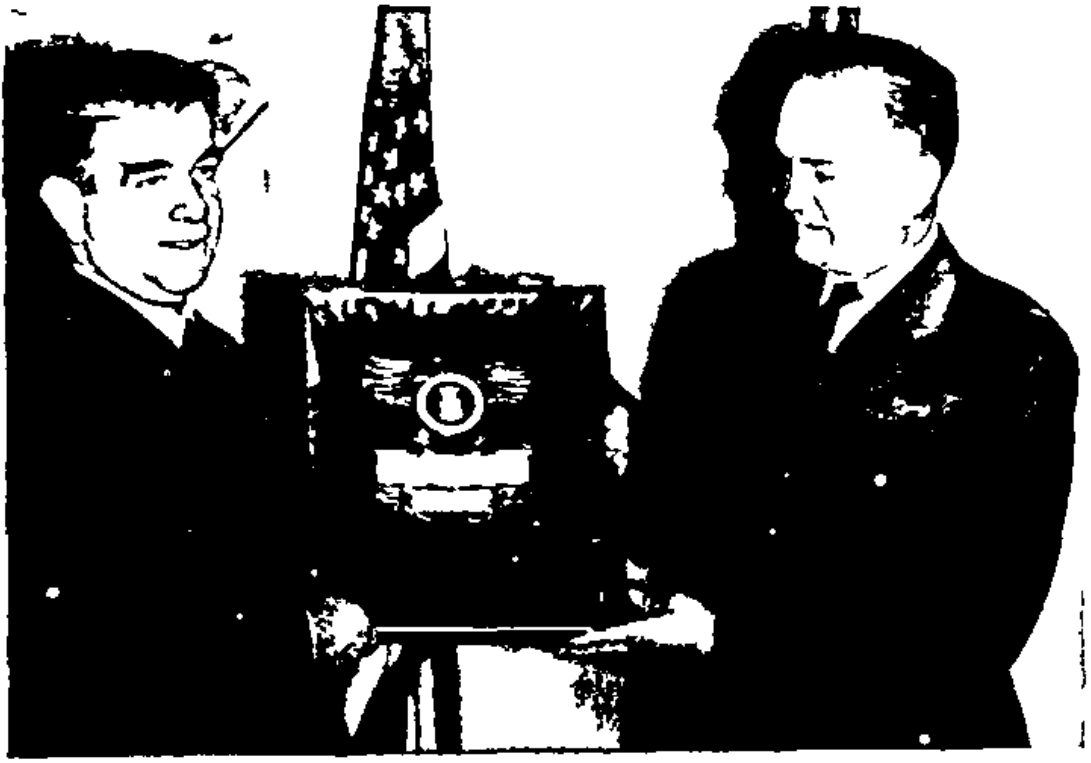
A large number of the speakers are from Department of Defense specialized facilities including the Armed Forces Institute of Path ology and U S Army Missile Ballistic Agency the U S Naval School of Aviation Medicine Air Crew Equipment Laboratory and Aviation Medical Acceleration Laboratory and the U S Air Force School of Aviation Medicine Aero Medical Laboratory Aeromedical Field Laboratory and Arctic Aeromedical Laboratory

The fifth Louis H Bauer lecture established in 1955 as a tribute to the Association s founder and a pioneer military flight surgeon will be given on 27 April by Dr Hans Selye distinguished professor and director of the Institute of Experimental Medicine and Surgery of the University of Montreal His subject is *Stress* in Aviation Medicine Dr Selye also will serve as chairman of a symposium on the aeromedi cal aspects of stress

The annual recipients of the Lyster Longacre Tuttle and Lil jencrantz Awards established in honor of early military flight surgeons and given annually by the Association for achievements in aero space

medicine will be announced at the traditional banquet on the last day of the meeting

Among the officers and scientists of the military services who will preside at various sessions are Brigadier General Sam F Seeley MC USA (Ret) Captains Charles F Gell nd Ashton Graybiel MC USN Colonel Harold V Ellingson and John P Stapp Lieutenant Colonel James P Henry and Major Edwin R Ballinger USAF (MC) Air Commodore William K Stewart RAF and Walter F Grether Ph D Henry A Imus Ph D and Horace O Parrack Ph D The membership of the executive council of the Association includes Brigadier General Victor A Byrnes USAF (MC) Rear Admiral Bertram Groesbeck MC USN (Ret) Captains Clifford P Phoebus Oran W Chenault nd Ashton Graybiel MC USN and Colonels Theodore C Bedwell Jr and Benjamin A Strickland Jr USAF (MC)



AIR FORCE SAFETY AWARD Climaxing an enviable record of more than 19 000 accident free air hours the 1st Aeromedical Transport Group Brooks Air Force Base Texas recently received the U S Air Force Safety Award Plaque This is the second such award won by the group the first being the MATS Flying Safety Outstanding Group Award for 1957 when its aircraft and crews flew more than 39 792 accident free hours and made 25 000 safe landings many times under [illegible] condition Receiving the plaque from Major General Russell L Waldon (left) Commander Western Air Transport Service during his recent visit to Brooks is Colonel Luther B Matthews group commander



THEODORE ROOSEVELT CENTENNIAL Arriving in the Panama C... Zone for the unveiling of a bronze bust of President Theodore Roo... in celebration of the centennial of his birth this group of distingui... guests was greeted by the Caribbean Command s Commander in-C... Lieutenant General Ridgely Gaither USA and the Canal Zone Go... Mr William E Potter Left to right Mr Edward A Bacon B... Assistant Secretary of the Army donor of the heroic bust G... Gaither Governor Potter The Honorable George H Roderick A... Secretary of the Army and Dr Frank B Berry Assistant Secr... of Defense (Health and Medical)

NEW AIR FORCE TRAINING COURSES

The Air Force has announced the development of two new cours... the military aspects of sanitary and industrial hygiene designed to m... Air Force requirement for sanitary and industrial hygiene engineers f... classes will be held each year at Gunter Air Force Base Alabama... first in September 1959 and the second in February 1960 It is plan... that sanitary and industrial hygiene engineer officers com... duty will attend this course prior to assignment

FIRST USAF NURSE COMPLETES STAFF COURSE

The first A r Force nurse to gradu te from the Air University Command and Staff School correspondence course Major E Lynne Christy s a licensed pilot w ith more than 200 flying hours She was active in the Civil Air Pat ol while serving t Dhahran Air Ba e in Saudi Arabia and has the d s tinction of bei g one of the first nurses as i n d to England w th the Eighth Air Force during World War II A flight nurse since 1950 Majo Chr sty s currently as ign ed in the Off ce of the Air Fo ce Surgeon Gener l



M jor Chr ty

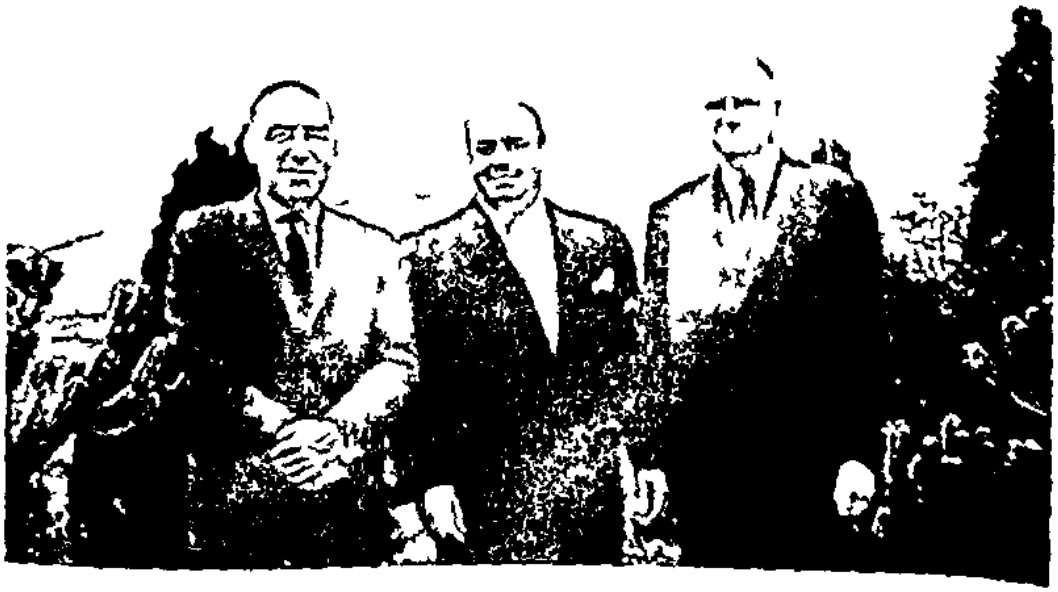


AWARD TO DENTAL OFFICER Major Jack L Hartley USAF (DC) son of Colo el and Mrs Leroy Hartley (R t) Ca mel Calif nd dent l offic r in the School of Avi ti n Medicine s D partm t of E perimental D t stry c es the Air Force C mmendation Medal from Major (e al Otis O Benson Jr Comm ndant of the School at Randolph A r Force B e Texas Major Hartley was awarded the decorat on f eption lly meritorious service o er a sev n year span during which t m he was ass g d to the Nati n l Bureau of Stand rds in W shington D C a d to the Sch ol of Aviat on Med cine



RESERVE DENTIST MADE ADMIRAL Dr William McGill Burns New York dentist is shown being sworn in as a rear admiral in the U S Naval Reserve by Rear Admiral Chester C Wood right Commandant of the Third Naval District in a recent ceremony attended also by Rear Admiral Clifford C DeFord District Dental Officer Dr Burns is the fourth reserve dental officer to be given flag rank

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MEXICAN MEETING Rear Admiral Rafael Vargas Salazar (cente Surgeon General of the Mexican Navy was host at his home to Dr Franc B Berry (right) Assistant Secretary of Defense (Health and Medica and Rear Admiral Bartholomew W Hogan U S Navy Surgeo when they recently visited Mexico City

NAVY DOCTOR GIVEN SPACE MEDICINE AWARD



Capta G ll

The Melbourne W Boynton Award for Sp ce Medic ne given annu lly by the Am rican A tronautical Society fo n out standing contribution to a tr nautics through medicine was presented recently to Captain Charle F Gell MC USN The 1958 award was mad to Captain Gell f r his w rk n the multicrew long d rat on confinement and explosive decompres ion of mammals Rear Admiral Edward C K n ey A sistant Chief of the Bureau of Medic e and Surgery for Per onn l and Prof s ion l Op rations made th prese tat on of the awa d at the annual meet ng f the soci ty in Vashington Capt in G ll is curr ntly serving as special as istant for medical and alli d science of the Office of N val Re earch

Correspondence

THE PALPATING HAND

To th Ed to —I ha read with interest and admirat o Lieutenant Colonel Eddy D Palmer s p p r Palpab lity of th Liver Edge in Healthy Adults n your December issue Dr Palmer h s made ob servation in this regard in 1 000 persons during rout ne I repeat his word *ro t e* physical examinations made for administrative rea ons Obviously h has kept c eful nd accurate reco ds of his d ta over a long period of time Instead of approach g this type of ex mination as an un nteresting chore necessary in performing his military duties he has realized that there is something to be learned nd valuable information to be ccumulated from any physical examination f not approached in a p rfunctory fashion This is an old fa hi ed form of cl nical re earch wh ch required *only* an *inquiring mind* a *palpating* hand and a centimeter rule to amass fund mental info m tion lu ble to Dr Palmer and to all who read h s p per There s not a ketosteroid an isotope an electrolyte or a c techolamine in the whole paper This type of work is now expected of Dr Palmer for no m tter where he h s served he has used the enormous opportun tie of army medi c to educate himself nd through his excell nt reports of h studies to t ch the rest of us

WORTH B DANIELS M D
W h gt D C.

Resolved That the American Medical Associ tion take immediate steps to recommend that discussion with appropriate federal depart ment be started with a view to developing a plan whereby reserve units and individuals who are not immediately involved in military operations should be used to s pplement civil defense operations and be it further

Resolved That a plan be developed with appropri te federal depart ments whereby reserve units be g ven an interim mission of supplement ing civil defense perations in these initial activities and be it further

Resolved Th t consideration be given to the f rmulation of an orderly plan for the rapid t aining of civil ans who have no military obligation to fill the places of m d cal reservi ts and be t further

Resolved That a plan be explored for the recruitment tra n ng and use of former medical personnel who have no further military obligation so that their services may be utilized for civil defense purposes

With respect to the rank of the Director of the Armed Forces Institute of Pathology the House of Delegates of the American Medical Association adopted the following resolution

Whereas By virtue of the imp rtance of the Armed Forces Institute of P thology to both military and c vil an medicine and more especially to Pathology in the world tod y and in order to provide an adequate recognition of the respons bilities placed upon the Director of the Armed Forc s Institute of Pathology therefore be it

Resolved Th t the American Medic l Assoc at on petition the Sec ret ry of Defense to provide for gen ral or fl g rank for the D rect r of the Armed Forces Institute of Pathology during his ten re of office

The adopted resolution pertaining to the membership of Armed Forces Public Health Service and Veterans Administration phy sicians in the Association follows

Whereas It is the policy of the Association as indicated in its Con stitution and Bylaws to condition Active Membership upon membership in a constituent association and

Where s Service Membership i a depature from this pr nciple and should be granted o ly in unusual circumstances such as ineligibility for local county society member hip and

Where It is somet mes impos ible for phys cians in the Armed Forces Public Health Service or Veterans Administration to obtain member hip in constituent associations because of certa n component society residence or practice requirements therefore be it

Resolved That the Hou e of D legates of the Americ n Medical Associ tion urge all c mponent societies to m ke e ery effort to pro- vide type of membersh p for Armed Forces P blic Health Service and Veterans Adm n stration physici ns wh ch will enable them to be ome Active M mber of con tituent societies and of the American M d c l Assoc t on

Officers Certified by Specialty Boards

The Surgeons General of the military medical services have announced that the following regular Medical and Dental Corps officers have been certified by the boards indicated

American Board of Radiology

Nuclea Medicine

Gun W l G C p USA

American Board of Obstetrics and Gynecology

P t W ll m F Lt C l USAF

American Board of Internal Medicine

M ll P rry B M j USAF
Sm h Phil p J C l USA
Sp y Ch l G Cap USAF
T m y D d M M j USA

American Board of Pathology

R h y Th od W C p USAF

American Board of Ophthalmology

Stok J m A C p USA

American Board of Anesthesiology

D d Edward P C p USAF

American Board of Preventive Medicine

Occupational M d cine

G L B L Col USAF

American Board of Oral Pathology

K pp M l J C pt USA

Official Decorations

The following awards were recently announced by the Departments of the Army and the Air Force

Legion of Merit

J ph R Sh ff C l MC USA

Army Commendation Ribbon with Metal Pendant

T S l M j MSC USA

Air Force Commendation Medal

J k L H rtl M j USAF (DC)

The papers reprinted were selected by three criteria that the article represented a significant surgical advance that it demonstrated the scientific method and that the principle or method described was still of current value These criteria did not necessarily result in the selection of the earliest publication on the particular subject Mont Reid's lucid article on problems of wound healing for instance was chosen in preference to any of Lister's original articles because it crystallized the whole subject so excellently This reviewer regrets at least one omission Reginald Fitz's superb description of acute appendicitis in 1886 an article which has unquestionably saved many more lives than for instance Bassini's description of a technic for inguinal hernioplasty

An interesting and unusual feature of the book is the brief biography of the author of each article together with his picture

—*JOHN B COATES JR COL MC USA*

COMPLETE DENTURE PROSTHESIS by *Daniel H Gladstone* DDS and *Orman Denenberg* DDS Formerly by *Rudolph Osterhout* DDS FACD 4th edition 542 pages with 310 figures W B Saunders Company Philadelphia 1958 Price $11

The fourth edition of this text contains many important changes necessary to reflect new improved technics and the use of new materials that have been developed for impression procedures It provides a comprehensive detailed step by step procedure for making functional and comfortable complete dentures The final chapter is of value for that occasional problem patient with extreme mandibular prognathism maxillary prognathism abnormal facial deformity or surgical loss of bone resulting in anomalies of the jaws and their relationship The authors have presented the subject of functional dentures in a detailed and readable form including a discussion of new material on the hinge axis technics for obtaining centric relation modern concepts in selection of tooth form as well as nutritional deficiencies and systemic diseases as they relate to tissue tolerance and irritation This volume is highly recommended as a ready reference for all practicing dentists

—*THEODORE F FISCHER COL USAF (DC)*

COLLECTED PAPERS OF THE MAYO CLINIC AND THE MAYO FOUNDATION Volume 49 1957 Published July 1958 Edited by Staff of *Carl M Gambill* AB MD MPH *James R Eckman* AB MA PhD *Martin Smith* BA *Florence L Shmidt* BSE *Gladys G Stillwell* AB MD *Guy Whitehead* BA MA PhD Secretary *Richard M Hewitt* BA MA MD and *Jane R Mayo* BA SD Compiled by *Gladys G Stillwell* AB MD 827 pages Illustrated W B Saunders Company Philadelphia 1958 Price $13

This volume is composed of selections from the published papers of the staff of the Mayo Clinic for the year 1957 The majority of the papers are abridged but some 30 are reproduced in their entirety The widely diversified subject matter has been arranged into sections under organ systems The editorial staff in their selection had the interests of the general practitioner the general surgeon and the diagnostician in mind They appear to have been highly successful The collection

is surely of general interest and written in a style which makes it relatively light enjoyable reading Although each section contained many articles of interest this reviewer an internist found especially entertaining the sections on radiology the alimentary tract and blood and circulatory organs This 49th annual volume will be a welcome addition to any bookshelf It is enthusiastically recommended not as a text or reference but for interesting informative and authoritative reading

—*R J PEARSON J Capt MC USN*

ROENTGEN DIAGNOSTICS Progress Volume 1 by *H R Schinz R Glaune* and *E Uehlinger* with the collaboration of *W E Baensch J E W Brocher U Cocchi R Glocker W Hess R Janker O Norman R Prevot G Schoch E Uehlinger S Welin J Wellauer* and *E Zdansky* Translated from the German by *James T Case* M D D M R E 623 pages with 545 figures containing 892 illustrations Grune & Stratton Inc New York N Y 1958 Price $35

The purpose of this book as stated by the authors is to assist the physician in keeping abreast of the trend of events in diagnostic roentgenology by the presentation of critical and comprehensive reviews on the subjects covered after the large numbers of individual contributions in the literature have been studied and evaluated The reviews cover a wide range of subject matter with an extensive bibliography following each review

A considerable portion of the material presented deals with specialized procedures which are being used with increasing frequency but which have not yet become entirely standardized Comprehensive and authoritative appraisal with detailed descriptions of technical procedures and discussion of film interpretation is of value to the roentgenologist The material is well presented Illustrations are largely reproductions of radiographs and are generally of high quality although these reproductions are positive prints rather than negatives which are now almost always used in this country That Dr Case one of the distinguished American pioneers in radiology and who through the years has made so much valuable German radiological literature available in English should have undertaken the translation of the volume is adequate recommendation of its merits He has been assisted by a group of able American and German radiologists This book is a worthy addition to any library of diagnostic roentgenology but unfortunately its cost will somewhat restrict its wide availability

—*CARR E BENTEL Capt MC USN*

TRANSPORTATION OF THE INJURED Emergency Procedures for Ambulance Crews Training Equipment Vehicle and Responsibility for Ambulance Service by *Carl B Young J* M P H Collaborating physician *Carl B Young* M D F A C S Drawing by *Richard Fry Jr* B S 238 page illustrated Charles C Thomas Publisher Springfield Ill 1958 Price $6 75

There has been a great need for this type of manual The author has presented his material with the clearness and simplicity necessary for understanding by both professional and nonprofessional personnel concerned with the immediate attention and transportation of the injured The book has been divided into two sections one prepared for t

of the illustrations are schematic and they are especially good in the chapter on scoliosis but they are lacking in the chapter on manual muscle testing Photographic reproductions would have added to the value of the book The value of background material is appreciated by this reader but much of it could have been omitted

Dr Licht has done an excellent job of editing this book and preparing a historical background on therapeutic exercises from the pre Christian area to the present This one volume encompasses the modern concept of therapeutic exercises for various conditions and systems It is a worthwhile book for the physician s library and it is highly recommended

—*GEORGE L VAUPEL Capt MC USN*

REHABILITATION IN INDUSTRY Edited by *David A Cant* MD with Foreword by *Howard A Rusk* 111 text Modern Medicine Publications 1 Medical Center Edition Chief *Asher J Lansky* MD Cloth 154 pages Illustrated Grune & Stratton New York NY 1958 Price $6

This book is intended for the general practitioner and gives a fine insight into the rehabilitation aspects of the management of trauma In the Armed Forces where trauma is the greatest cause of noneffectiveness this guidance is invaluable to the medical officer in the dispensary or small hospital who first sees the patient and initiates treatment Of particular value is the discussion of the management of the psychological complications of trauma Where applicable excellent brief discussions of basic normal and disturbed physiology are included This effectively provides a background for understanding rehabilitation procedures and technics The chapters on vascular soft tissue back and hand injury are excellent They are especially applicable to the small medical facility where neither special training nor special equipment is a usual resource The sections on amputation and spinal cord injuries are directed to specialized treatment centers but the guidance for early management of these types of injury is excellent This monograph places rehabilitation in the perspective that involves the physical psychic and socio economic aspect of the patient medical care at each echelon of treatment has a rehabilitation responsibility It clearly states basic principles and guidance for the early return of patients to effective duty This book is recommended for general practitioners general duty medical officers and dispensary surgeons

—*LOUIS C KOSSUTH Col USAF (MC)*

THE NEUROLOGICAL EXAMINATION Its Interpretation Fundamentals of Neurology and Neurophysiology by *Russell N DeJong* MD 2d edition 1078 pages with 368 illustrations P B Hoeber Inc New York 16 NY 1958 Price $20

This is the second edition of an excellent reference book which has been of great assistance to students of neurology since it was first published in 1950 In almost every chapter or section one can find changes additions or deletions which testify to careful and thorough revision of the entire work The great wealth of information integrating neuroanatomy and physiology with their clinical implications is carefully organized and easily retrieved The index allows rapid reference New material

is not extensive but there is further emphasis on cortical and thalamic sensory disturbance newer developments in visual field testing and central regulation of ocular movement special audiometric technics present view of the pyramidal system the so-called extrapyramidal complex and the brain stem reticular formation and their relation to disorders of motor functioning the influence of the reticular formation in disturbances of sleep and consciousness and the anatomic basis for psychomotor temporal lobe epilepsy A chapter on suspected hysteria and malingering is of special interest to the military physician The author's recording of these subtle diagnostic aids is excellent The young student in neurology can tap reflexes with his finger and can carry much data in his mind but it is very helpful to have a reflex hammer and to have a copy of DeJong" near his desk

—*THEODORE M BADGLEY Maj MC USA*

AUTOPSY DIAGNOSIS AND TECHNIC by *Otto Saphir* M D Foreword by *Ludwig Hektoen* M.D 4th edition 549 pages illustrated Paul B Hoeber Inc Medical Book Department of Harper & Brothers New York N Y 1958 Price $8 50

In this new edition the author has again in admirable fashion reached his intended goal namely to produce a manual which will aid the student intern and young assistant not only in the proper performance of an autopsy but in the reasonable and accurate evaluation of his findings Four new features have been added two of them timely and all of interest For the first time a historical introduction borrowed from Dr Sidney Farber has been included and serves as a ready though brief reference to the history of the autopsy The tables on weights and measures new to this edition are very appropriate in a text of this kind The first of the timely chapters deals with precautions to the pathologist dealing with patients who have been treated with radioactive isotopes The inclusion of a chart contained in U S Bureau of Standards Handbook No 65 *Safe Handling of Bodies Containing Radioactive Isotopes* " showing approximate remaining levels of radio activity on successive days would have been a valuable addition to this chapter The second new chapter concerning the collection of tissue bank material is timely but appears to contain an error on page 482 where it states that material should be taken from patients over 40 years of age The chapters dealing with authorization for autopsy and findings in unexpected death have been appreciably expanded Particularly valuable is the discussion on malpractice coroners cases and authorization of an autopsy The section on heart and blood vessels is a pleasure to read as it again reflects the great interest and the profound knowledge possessed by the author in this subject although condensed sufficiently to fit the purpose of this handbook

—*KENNETH P ERNST Col MC USA*

RADIOACTIVE ISOTOPES IN CLINICAL PRACTICE by *William H Quimby* Sc D *Seymour Feitelberg* M D and *Solomon Silver* M D 451 pages illustrated Lea & Febiger Philadelphia Pa 1958 Price $10

This is the latest of a series covering the clinical use of radioisotopes compiled from teaching material used by the authors with

offered a four week full time comprehensive course since June 1954 Two of the authors Drs Quimby and Feitelberg are primarily interested in physics and thus two thirds of the book are devoted to this aspect of the clinical use of isotopes For this reason perhaps the title is misleading The average clinician will find only a minimal discussion of various established diagnostic and therapeutic uses of isotopes The basic physics section written by Dr Qu mby is particularly well done and is an excellent review of the material The methods of dose calculations are clearly spelled out and the mathematical formulas well explained The part on instrument tion and laboratory methods suffers by comparison in as much as this is a rapidly expand ng f eld and a number of instruments descr bed have already been superseded by de tectors that are not only easier to operate but more reliable The prin ciples however have not changed and the sections relating to these are good It is surpris ng that there is little refere ce to newer methods of low level counting which will not only reduce the amount of radio c tivity required but will increase the physician s cap bility of follow ing the patient o er a period of t me The liberal use of d agrams and schem tics throughout the book helps to explain diff cult points This book is recommended as a b sic reference particularly in the physical aspects of the clinical use of isotopes

—JAMES B HARTGERING Lt C I MC USA

PROGRESS IN RADIATION THERAPY d t d by *F a B bk* M D 284 p g s ll tr t d Grun & Str tto Inc N w Y rk 16 N Y 1958 P $9 75

The development of radiat on therapy from its beginning to the pres ent is outlined in general and at t mes in considerable deta l in this first of a contemplated series of annual or biennial books of the same title Though the book is general in sc pe specific chapters discuss renal embryoma int acranial m lignancy radi t on tolerance of the central nervous system thyroid carcinoma and nonmalignant eye dis eases The e subjects were apparently selected because of their con troversial n ture Adherence to generalities or the addition of other specific chapters would probably have enhanced appeal of the book for mo t readers Each chapter is followed by an extensive b bliogr phy For the older r d ologist it is interesting refreshing and provides ready references for more detailed read ng It is for the resident in radiology that the book is of particular value All physicians interested in the tre tment of malignant disease by radiation therapy will find it useful *—PAUL A PADEN C I MC USA*

PHOTOMICROGRAPHY by D *R y W. All* 2 d ed t 441 p g ll ted D Van No and Company Inc N w Y k N Y 1958 Pr c $9

The econd ed tion of this book conveys to the reader basic prin c ples nd tech c l details of photomicrography w th exceptional nd clar ty The me l cal profession and especially the pathol og st re prod cing the larg t volume of published photomicrographs but th f ld of medic l ll stration p ctures of mediocre quality t en m h t o often Th uthor collected a w de variety of photo

microgranics in the last chapter must set a high standard of usefulness, quality and practical completeness as well as accuracy and exactitude of data. Low and very high power enlargements present special difficulties that are dealt with in detail. The characteristics, limitations and selection of Lens filters are well illustrated. Choosing a proper color filter is difficult. A sort of coefficient of knowledge of its technical characteristics as stated by the author. No one need be ashamed of his ignorance in this respect for this is a problem likely to stump the best of us. A fine description and illustration are given of modern equipment as well as older apparatus. A chapter is devoted to special photomicrographic processes including among others application of color photography, the use of ultraviolet light and narrow spectral bands all important techniques for the biologist. This manual is recommended for post graduate courses in photomicrography and is a must for medical photographers.

—J. E. SZILARD, M.D., CHICAGO

JUVENILE DELINQUENCY, edited by Joseph S. Roucek, with the collaboration of 14 eminent authorities. 340 pages. Philosophical Library, Inc., New York, N. Y., 1956. Price $10.

This work consists of 15 chapters on various aspects of juvenile delinquency including articles on the dimensions and legal, economic, biological and cultural aspects of the problem. There is also an interesting chapter on the relationship between mass media and juvenile delinquency, a balanced and careful appraisal which among other observations concludes that there is no good evidence that avid reading of comic books is a primary factor in causing delinquent behavior. While the point of view of most of the authors appears to be that delinquency is the result of a multiplicity of interacting factors—social, cultural, economic, inter- and intra-personal—the emphasis is naturally on the importance of sociologic factors. The point is made more than once that perhaps the majority of delinquents are not "sick" individuals psychologically speaking, but deviate from conventional norms of behavior because of identification with the standards of the group to which they belong, that in a sense they have a capacity for group adjustment which is a frequent criterion for gauging normalcy. Such persons may not be as individuals psychologically abnormal. It is implied here and there that psychiatry does not recognize this sufficiently. There is one chapter entitled "A Critique of Psychiatry" written by Professor Harkeem of the University of Michigan which decries the allegedly stultifying influence of psychiatric thought on efforts to understand and treat (Professor Harkeem would object to this last word) juvenile delinquency. There is just a smidgen of truth to some of this writer's strictures but he vastly overstates his case in a curiously passionate, almost polemic fashion in contrast to the balanced and even tone of the majority of other articles in this interesting and informative book.

—CHARLES S. MULLIN, J. Crim.

DIFFICULT DIAGNOSIS A G d t th I t rp t t f Ob cur Illn by *H J R b t* M D 913 p g ill trat d W B S und r C mp y Ph l d lph P 1958 P e $19

This volume has been prepared by a practicing internist as an aid in early recognition of obscure diseases The aim of the text is to serve in the di gnosis of the e conditions at the onset of the illness rather than late in the disease when the classic syndromes have been fully developed The differential diagnosis of several clinical mani festations which frequently are the presenting features of systemic disorders are included and an nalysis of the possible complications and therapeutic measures employed are discussed Emphasis is placed on the fam lial pred sposition to disease n asymptom tic rel tives and the recognition of strik g genetic linkage in ce tain disea s is stre sed One entire section is devoted to obscure postoperative complications and m d cal surgical problems relating to bdominal pain gastro intestinal h morrh ge and intestinal obstruction This volume containing a wealth of hard to-find information will assist the general practitioner surgeo and internist in h s analysis of findings manifest i disease of ob cure et olog Y The extensive bibliography of more than 3 000 titles and statistical information mak this text a aluable reference for the cl n cal nvestigator

—*WILLIAM STEIN Lt C l MC USA*

LUMBAR DISC LESIONS I th g s d T tm f L w B k P d S t c by *J R Am t g* M D M Ch F R C S w th for word by *H O m d Cl k* C B E F R C S 2d d t on 244 p g ll at d Th W ll am & W lkin C mp y B ltimor Md 1958 P $12

In sp te of or perhaps because of the voluminous literature dealing with low back pain and sciatic nerve symptoms cons derable dif ference of opin on till exi ts regarding the causative factors Thi e cellent book appears to crystallize th role of the intervertebral disk It is concise and well written Th numerous illustr tions mo tly diagrams emphasize the important features in th text One could almost adsorb the theme of the book by studying the diagrams and th acc mpanying capt ons In ddit n to thoroughly covering lumbar d sk lesions there is an e cellent sect on on the differential diagnosis of low back p in nd sci tica The author s vast experience drawn from 1 000 documented disk operat ons does not prejudice his op n on regard ng the conser at ve treatment of patients with low b ck pain nd he outlin s a ery intell gent program of conserv ti therapy He is firm in h s opposit n to the use of myelography as a routine d gnostic tool nd presents pl us ble arguments against it

One can find very l ttle to cr ticize in th s book The only omis th t s noticeable is that chordoma i not included n the d f t t al di gn of neoplastic conditi ns Here is a useful co b to m d al liter tur to be re l by yone treati g back pain

—*HERBERT A MARKOWITZ C pt MC USN*

OBSTETRICAL PRACTICE by *Alfred C Beck* M D and *Alexander H Rosenthal* M D th edition 1 115 pages illustrated The Williams & Wilkins Company Baltimore Md 1958 Price $14

The seventh edition of this classical text on obstetrics retains all the outstanding features of the previous editions The chapters on the development structure and physiology of the placenta prolapse of the umbilical cord and multiple pregnancy have been completely rewritten The revised sections stress the current concepts on the management of pregnancy labor and the puerperium and neoplastic changes in the chorion and hydramnios Pitocin is recommended for uterine dysfunction and replaces the use of the abdominal binder X ray examination is restricted to specific indications and the Brandt Andrews method of placental expression and manual removal replace the true and modified Crede method in the management of the third stage of labor The book retains its original format including the liberal use of simple sketches to illustrate the discussion These are markedly effective particularly for the understanding of the normal and abnormal mechanisms of labor Controversial subjects are not discussed as the book is intended for medical students and can accordingly be highly recommended for such students interns and general practitioners

—*WILLIAM C HERNQUIST Lt Col USAF (MC)*

CLINICAL RADIOLOGY OF ACUTE ABDOMINAL DISORDERS by *Bernard S Epstein* M D 352 pages illustrated Lea & Febiger Philadelphia Pa 1958 Price $15

This comprehensive textbook is not a descriptive volume of the radiological findings in the acute abdomen" but rather a clinical treatise of those abdominal complaints in which roentgenologic studies and their competent interpretation will be of benefit to surgeon internist and patient alike The text has been kept to a minimum but there is an ample bibliography following each condition discussed Radiological technic and types of examination are not included The individual radiologist as the author implies in his preface should use those technics which give him the best results and which do the patient the least harm

Of four chapters the first includes a section on the embryologic development of the abdominal viscera and covers all the common and many uncommon congenital disorders This is followed by a chapter on neoplastic diseases Chapter three deals with inflammatory disorders parasitic and granulomatous diseases collagen and metabolic disturbances as well as vascular disorders In chapter four the author discusses trauma foreign bodies and the effect of drugs Most conditions discussed are well illustrated by clear positive reproductions This text makes a worthy contribution to radiological literature It will be of particular value as a ready reference to the young radiologist and resident who occasionally fails to make a diagnosis because he just doesn t think of a particular condition at that

—*JOHN A ISHERWOOD USA*

DIFFICULT DIAGNOSIS A G d t th In rpr t t
by *H J R b t* M D 913 p g ll trat d W
Phil d lph P 1958 P $19

This volume has been prepared by a practicin
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fully developed The differential diagnosis of s
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disorders are included and an an lysis of the po
and ther peutic measures employed are di cussed
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and the recogn tion of striking ge etic linkage
is str ed One entire sect on is devoted to o
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pain gastro intestinal hemorrh ge and intestin
volume conta ning a wealth of ha d to-find inf
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findings m n fest n disease of obscure eti
bibliography of m r than 3 000 titles and
make th s text a valu ble reference fo the clinical

—*WILLIAMS*

LUMBAR DISC LESIONS P th g s d T t
d S i t by *J R \m t g* M D M C
for word by *H O m d Cl k* C B E F
p g ll d Th W ll am & W lk C
1958 P $12

In spite of or pe hap becau e of the volum
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INSTRUCTIONS FOR AUTHORS

Th *United States Armed Forces Medical Journal* i devoted to th publication of ori inal investigation observation and clinical experiences of interest to personnel of the medical ervice of the thr e military department Contributors who are affiliated with the Army or Air Force in a commi ioned enli ted or civilian capacity hould forward manu cript in triplicate to their respectiv Surgeon General in accordance with exi ting regulation Naval contributors may ubmit manu cript in triplicate either to their Surgeon General or directly to the Editor When an article by a person in the naval service i accepted for publi cation one of the triplicate copies will be forwarded by the Agency to the Secretary of the Navy which will constitute compliance with regulation Authors not affiliated with one of the armed ervices hould end manu cripts directly to the Editor Whatever the channel of ubmi ion the covering letter should state that the author desires the manu cript be given con ideration for publi cation in this *Journal* Accepted manu cripts become the property of the Armed Forces Medical Publication Agency

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REFERENCES

Reference to published literature should be listed at the end of the article in the numerical order in which they are cited in the author text Care and accuracy in their preparation will expedite publication of the article Following are correct examples of references

Fleming A Young M A Suchet J and Rowe A J L Penicillin content of blood erum after various do es of penicillin by various routes *Lancet* 2 621–624 Nov 11 1944

Cabot R C Pernicious and secondary anemia chlorosi and leukemia In O ler W (editor) *Modern Medicine* 3d edition Lea & Febiger Philadelphia Pa 192 Vol 5 pp 33–100

FIGURES AND TABLES

Photographs should be black and white unmounted and untrimmed glo sy prints preferably not larger than 8 by 10 inches in size If the identity of a patient i recognizable in a photograph it must be accompanied by the patient s signed statement authorizing it publication The magnification of photomicro graphs mu t be stated No marks writing or typing should be made on the face or back of photograph The author s name and an identifying legend may be affixed to the back of each print with pa te or glue paper clips pins and staples should not be u ed Spe i l care hould be given to the prepiration of graphs and tables Th y hould be dra n or printed in black ink on white paper and must be accompanied by an explanatory legend

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Cardiac Arrest After Infarction

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CLINICOPATHOLOGIC CONFERENCE ☆ CASE REPORTS

UNITED STATES ARMED FORCES

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(Army Medical Department) Appears monthly and is distributed free by the Surgeon General United States Army

Quarterly Cumulative Index Medicus
(American Medical Association) Author and subject

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THE DIRECTOR OF THE BUREAU OF THE BUDGET 10 FEB 1959

Monthly Message

E er s ce I h ve been n my p es po o I ha e bee exceed nte ested n the I us ial College of the Armed Force all tha it h to offer the off cers of the a med rv ce a perso n l fro Federal d partm n nd g ncie The ten month r cou is comp ble to a ye r nostg a uate c u e n gene l e cat on given at ou major un ers t es Th f cu of the I ial Coll ge is elected from th armed fo ce an c il n Fe eral d p ments. The majo ty of the lecture s come f om ll sh se of ou ec o om lead rs in busi es go et me b so v eco omics cie ce ll t e p ofess ons ci li n well n l an and the majo epa rments of ou gove me I ha been m good fo t e t mea as t t g l ctu r on two occas ons

Although m li ry et quette s pa tial usl obse the whole sp t is one of coope t on w hout thought of ran e ice excep s e ch can cont b te f om h s own exper ence A he nat ve reports are ssu d by the var ous team mo wh ch t e cla s is div ed an formal g adua on ceremo s s a e held t th n of each acad mic year

In ad t on to the e d nt cou e the college offers a com pe den course nd p e ems a onal Def n Pesou Conf ren s m d f fe m c thro hou th ou n Thes co f ces are conducted by fac l t ms f m the college for t e benef o e erve l tary off c s nd me es d c il n nd s co me ce o mme th p o ss ons o h r w lks o l f

S e th n of "e ld W II the colle e h s been housed i n e wa e f l at oo to be correct d Lt Ge al G W n l S F the p ese m u nt confe d a reat honor on the m d cal o on l D e mb r 1959 b vit g me to part c th n the ou b rea g e ments for a n w c ll ge bu ld to l be a es

In pre r for th o ca on I re ewe the eco of par e at on b the med cal ll f e on th th ee cou e of med b the In s ial College— las ll too n ll Fre v ommu ty sh ul b tak n to encourag d c l n tm f c rs or acti du s to am l for the e cou e and w th comple of rea and l ger c ments t o y a s hence dit onal pos tions f t e r s em cou s ould h o b Effo s also sho ld be made to st ul e the e e t of reserve ical D m l nd Med cal Serv ce Co p of ce s i tak the con re non ce co e an of c lian me c l a ll d ne sor el in n the Na o al D fe e R ou c s Co ferences

Af t ser n thers the spec al v o m l an me c e wh ch o ll be s doctor uniform

Frank B Berry

FRANK B BERRY M D
A t t S t of Def n e
(H lth nd M d ll)

UNITED STATES ARMED FORCES MEDICAL JOURNAL

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FRANK B BERRY M D
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MAJOR GENERAL SILAS B HAYS
S g C l U t d St Army

RI AR ADMIRAL BARTHOLOMEW W HOGAN
S g G l U t d St t Navy

MAJ I GENERAL OLIVER P NEWMAN
S C l U t d St t A F

UNITED STATES ARMED FORCES MEDICAL JOURNAL

Volume X April 1959 Number 4

TENTH ANNIVERSARY OF SPACE MEDICINE RESEARCH IN THE U S AIR FORCE

The Origin of Space Medicine

HARRY G ARMSTRONG *Maj r G n al USAF (MC) (Ret)*

WHEN the history of the twentieth century is written some 50 or more years from now, it seems quite certain that space medicine s contributions to the advancement of civilization during the latter half of this century will receive prominent mention in any such account If so the writer of such a history will under existing circumstances be at a loss as to how, when or where this new field of medicine came into being for there now exists no written record of this event It is the purpose of this report to provide this missing data

While the advent of a new field of science is always a notable occasion this is especially so in the case of space medicine because among the various fields of military medicine currently being employed to support our military forces space medicine unquestionably ranks number one in strategic importance At the same time it occupies an eminent position in the general field of science in regard to its current and potential for future contributions to an understanding of nature s most closely guarded secrets This latter will accrue from space medicine s key role in enabling man to travel in pace This is not an end in itself

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but rather a means to an end whereby the outer reaches of the earth s atmosphere and the space beyond may be studied at first hand by scientists of all disciplines concerned with unraveling the mysteries of the universe

In order that some of the difficulties surrounding the origin of space medicine may be understood it is necessary to refer to the situation as it existed beginning in 1946 At the end of World War II the U S Air Force School of Aviation Medicine lost essentially all of its research staff when those so engaged were released from the service and returned to civilian positions The recruiting of a new research staff for the school was a slow and difficult process It was not until about the end of 1948 that enough replacements were available to make it necessary for the various departmental programs to be reviewed and co-ordinated In order to accomplish this the heads of the various research departments were instructed, early in January 1949 to prepare long range plans for their respective departments and submit them to the commandant for co-ordination and approval

Among other there was a plan submitted by Professor Hubert Strughold recommending that a new department with the responsibility of studying the human problems of space flight be established at the School This plan had been evolved by Professor Strughold after consultation with a fellow staff member Dr Heinz Haber who also was interested in such an undertaking

If Professor Strughold proposal had been delayed 10 years, that is until today, it would be universally regarded as an obviously needed—in fact an urgently required—program Conditions however were quite different in 1949 and the plan had to be formulated by Professor Strughold and evaluated by the School in the face of the following circumstances At the time military strength in general and our military research and development programs in particular were being sharply curtailed in economy measure For example the Air Force had let a research and development contract for the Atlas missile in 1946 forced to cancel it in 1947 due to lack of funds Between [illegible] and the date Dr Strughold submitted his plan no other [illegible] contract for similar missiles had been let so that at [illegible] lance his proposal recalled a suggestion that a cure be [illegible] ed for a disease that did not exist

In [illegible] to the state of affairs external to the School there were [illegible] internal problems that had to be considered The first of these [illegible] the extremely limited assets available to the School at that [illegible] this meant that only projects of the highest priority and of [illegible] intense concern should be authorized The second problem [illegible] with the possible reaction that might occur if the School were to expend scarce man hours and funds on a matter that was far [illegible] ar to the public only through the comic strip of the daily [illegible] papers and the weekly comic magazines Under these circumstances a press story questioning the wisdom

of the proposed studies or one that made light of them could very well have triggered a public and official reaction of such proportions that the school s entire research program could have been placed in serious jeopardy

After assessing the validity of these various possible objections to the proposed laboratory, it was concluded that none of them were of overriding importance for the following reasons From an engineering viewpoint it was known that a man carrying space vehicle could be designed and constructed, and the tremendous military and scientific value of such a device was quite obvious to those qualified to judge such matters Based on these considerations it seemed certain that such a vehicle would be built as soon as its worth was more generally recognized The time factor involved was estimated to range somewhere between 10 and 20 years

The question as to whether or not the proposed study was of immediate practical importance was decided in the affirmative, based on an estimate that a lead time of 10 to 15 years would be required to work out the essential medical problems involved, which dovetailed nicely with the time estimate of the availability of an operational space ship In the interim, the accumulating medical data would have useful sequential application to the altitude problems which would be created by the new jet and rocket propelled aircraft then being constructed or in the planning stages

That news stories concerning the new laboratory might be written in an ironic or satirical vein to bring the school into public and official disrepute was never given very serious consideration In dealing personally with the general press over a period of some 1 years its reporting of scientific matters had always been observed to be entirely objective and constructive in its attitude Consequently, it was thought that this same thing would apply in this instance and subsequent events proved that assumption to be correct

By this time it should be quite evident that Professor Strughold s proposal was to be approved but before final action could be taken a name had to be selected for the new laboratory This proved to be an unexpectedly difficult task because there were literally dozens of terms that were generally suitable but lacked the exact shade of meaning that would make them technically correct Finally the term "space medicine was recommended by Professor Strughold and was adopted This term has stood the test of time and the basic term space" has, since that time, been almost universally accepted by other scientific disciplines, and the term space travel, space probes, space suits, and others have become a part of our everyday, as well as our scientific, language

The matter of terminology having been decided upon an official order was issued by the U S Air Force School of Aviation Medicine creating a department of space medicine within the research division of the school The effective date of this order was 9 February 1949 Initially the commandant of the school assumed the added responsibility as director of the new department in order to expedite its organization and to permit its newly assigned staff members Professor Strughold and Dr Heinz Haber to devote full time to initiating a research program As soon as the new department was well established and functioning however the commandant relinquished this added duty and Professor Strughold was appointed as the first permanent chief of the new laboratory in May of 1949

Shortly thereafter two other members of the school s research staff also began working in this new laboratory and thus share in the honor of having pioneered in this new field of science I refer to Professor Konrad J K Buettner an environmental physicist and Dr Fritz Haber an aeronautical engineer

The School of Aviation Medicine is to be commended for commemorating the tenth anniversary of the founding of the department of space medicine for bringing these four pioneers of this important new science together here today as honored guests and for having them present the major portion of this program

For my own part I should like to pay tribute to Professor Strughold Dr Heinz Haber Professor Buettner and Dr Fritz Haber for their foresightedness imagination and courage in their pioneering efforts in and their subsequent brilliant contributions to the advancement of space medicine For their efforts in this regard they are entitled to a profound feeling of personal satisfaction the highest regard of those who are privileged to count them as friends and the gratitude of our nation whose interest they have so ably served

The Present Space Medicine Effort at the School of Aviation Medicine

PAUL A CAMPBELL *Colonel USAF (MC)*

TODAY 9 February 1959 10 years after the founding of the Department of Space Medicine one can safely say that space medicine has spread into each division every department of the School of Aviation Medicine and every nook and corner The over all effort in space medicine and space biology is co ordinated through a space co ordinating committee

D C mpbell h h f D f Sp M d U S Ai F S h l
f A f d R nd lph A F B T

—the research effort, through the Directorate of Research and the teaching effort through the Directorate of Education

Since its inception there have been no true divisional or departmental barriers at the School of Aviation Medicine The team concept has been the rule Divisional and departmental segmentalization has existed solely for administrative purposes

Let us first consider the teaching effort Here it must be pointed out that almost all of our teaching personnel are involved in research, and almost all of our research personnel in teaching

As is quite evident to this audience, it is difficult, if not impossible, to draw a line and say—this is where aviation medicine ends and this is where space medicine begins—but it is our duty to take the younger doctors who are in the primary and advanced courses of aviation medicine and extend their horizons into the space concept, and to take the more mature flight surgeons and, through refresher courses, keep them informed of the effects of missilry on their jobs and the effects of the space concept on their profession

Various support groups, such as the physiological training officers group are also brought in from time to time for a review and for extension of their horizons I believe it can be truthfully said that the School of Aviation Medicine is the only institution of the free world, and possibly of the entire world, with an organized sustained program for training relatively large groups of people in space medicine

The impact of this program is evident from another point of view large numbers of visitors from other institutions, industry other government agencies, information medias and so forth visit the school in quite substantial numbers for briefing and consultation Through the organization of symposia such as that held last November on the subject of medicine and physics of the atmosphere and space [1] and participation in programs throughout the country and free world, the new knowledge produced or organized by the School of Aviation Medicine is projected far and wide

The research effort in space medicine and space biology is also spread throughout the school The School of Aviation Medicine U S Air Force is the direct lineal descendant of the original unit at Hazelhurst Field, Mineola, Long Island, of World War I extending through the School at Brooks Field of the twenties and has been on Randolph Air Force Base since 1931 Since its beginning at Mineola the School of Aviation Medicine always has had as a major mission, and what is probably its most important research mission, the research and development of physical, physiologic and psychologic

criteria for selection of flight personnel Within its environs, its records, and within its people has accumulated the world s greatest storehouse of knowledge in this field In every department this specialized knowledge nurtured by validation projects consultations and so forth is being extrapolated into the space concept Other than in the field of selection the broader efforts in space medicine are in the Space Medicine Division (which I shall come back to later) the department of radiobiology and the departments of physiology and biophysics The departments of physiology and biophysics have, in cooperation with the department of radiobiology developed the basic research and important hardware for mouse and primate biopack units and have trained acclimatized and conditioned animals for future adventures into space They have also developed or have selected and modified miniature instruments for the recording or telemetering of the required information Another effort in this department is concerned with studies of the effects of acclimatization and conditioning in relation to the various parameters of space flight

The Space Medicine Division is a direct outgrowth of the Department of Space Medicine It is now divided into four departments astroecology biogravics bioastrophysics and bioastronautics The Department of Astroecology is concerned with the development of closed ecologic systems in which man can live in his own little encapsulated world with only those resources that can be carried along or extracted from the energies of space All the contents must be selected within the framework of minimum weight allowances miniaturization from the standpoint of volume and maximum conservation The recycling of nutrients fluids and vital gases are under study To meet these ends a series of studies have been completed for the development of base lines measuring most of the more important parameters of the individual in the isolated environment of the space cabin simulator for long periods of time Now the studies are being directed toward weight and capacity reduction Whereas it took a daily weight of about 100 pounds in food oxygen fluid absorbents and containers to support Airman Farrell in his well known 7 day run ideally it should only require about 40 pounds a day In present studies it is hoped to bring these figures together From our studies it has become quite evident that a space cabin simulator will be an extremely necessary selection and indoctrination device for manned pace flight A new sealed cabin (fig 1) much more efficient than the present one is now under construction and will be completed shortly after the move into our new facilities at Brooks Air Force Base

Another study is under way concerning the use of algae and so forth as biological gas exchangers (fig 2) Mice now

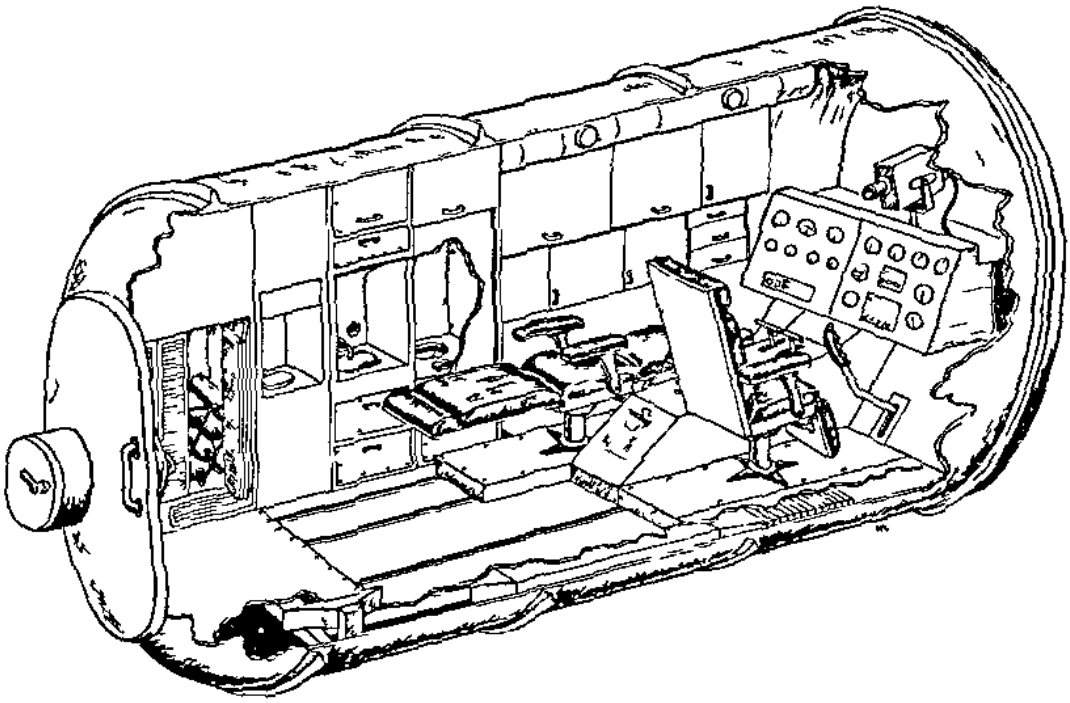


Figure 1 Space cabin simulator under construction for space medicine division U S Air Force School of Aviation Medicine

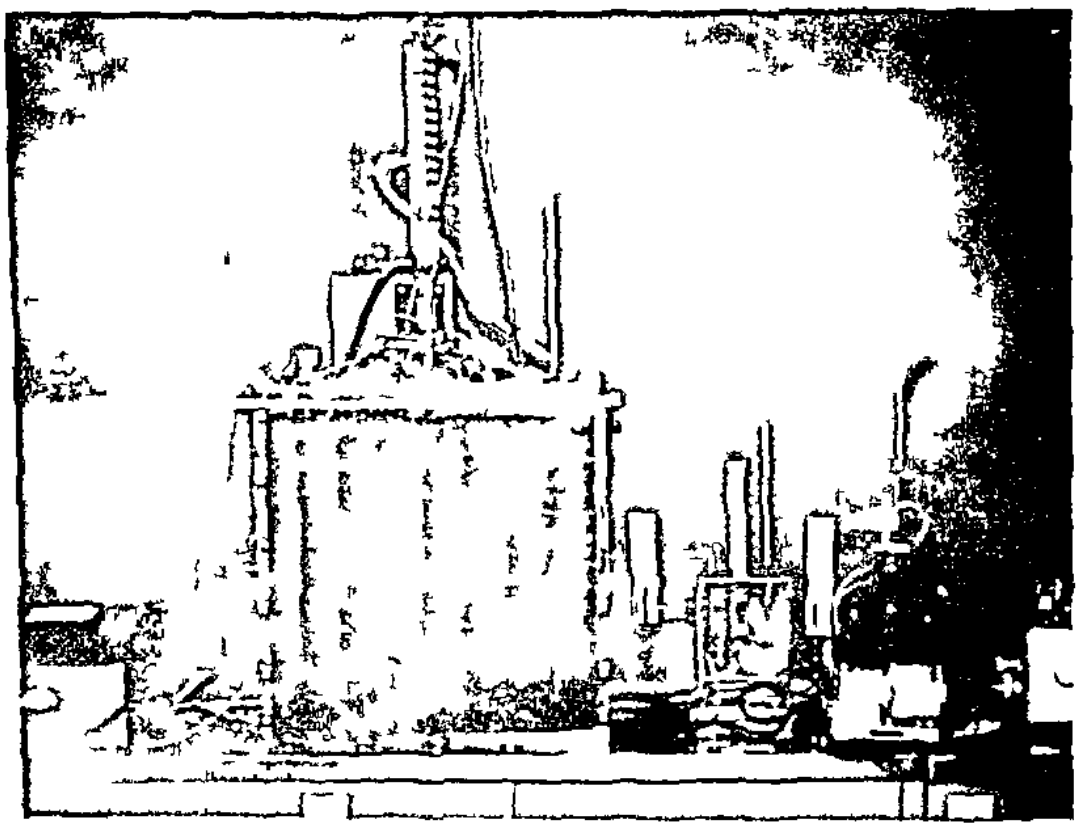
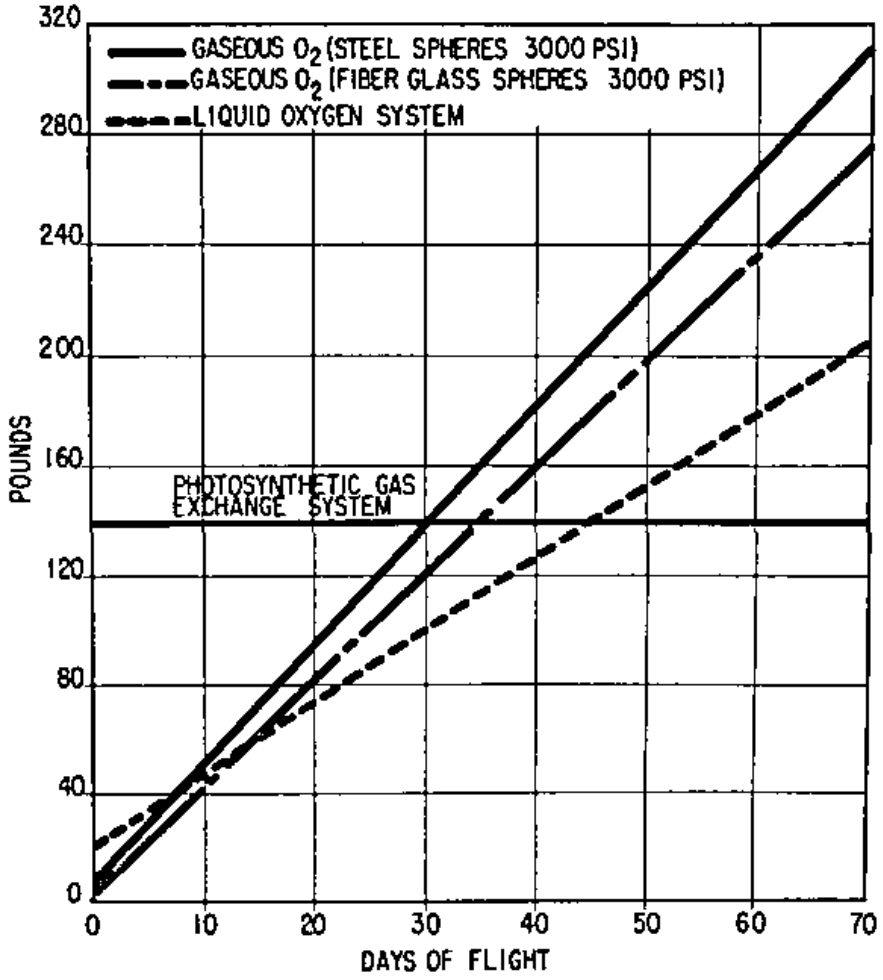


Figure Biological gas exchange using algae presently in use at the U S Air Force School of Aviation Medicine

can be kept alive for long periods in this system I am told that recently four mice were kept alive in a small closed system for 27 days The state of the art of such biological gas exchangers is improving in leaps and bounds In explanation of



F g 3 C mpa f xyg pply y t ms f h ma p fl ght b d up th f ll wmg d t (1) Th a t a t u ld q 875 g m f xyg per d y (2) N p nalty ppl d t the xyg pply g y t m f th ab l ty t ut l z a b d x d (3) At p t th ery l ttl format on on m g p bl p w f t l t pa q tly th w ght d ff t f th h b en m tt d f m th mp t t

this effort figure 3 demonstrates the weight costs of the various types of oxygen supply for the astronaut in terms of the time periods during which their efficiency becomes manifest As can be seen space flight for lon periods probably will require a bioloical gas exchanger of some type Space stations or bubble colonies will most certainly require them

The department of bioravics is concerned with studies of the effects of weightlessness on man Through flights alon Keplerian parabolas they began with the ideas of the pioneers

who are here today, then carried them into T 33 aircraft operations, then the faster F 94s, and now are ready to utilize the Century series of aircraft Time in the weightless state has been extended into periods of more than 40 seconds, and soon will be increased to a period near a minute Some of our people have accumulated many hours in the weightless state One pilot who recently left had flown more than 2,200 parabolas Again our studies point to the necessity of using such a device for selection, indoctrination, and training for space flight

Bioastrophysics is concerned at this time with the design and instrumentation for the other departments With changing concepts, new ideas, and the development of the art, this is a huge task and demands pioneering efforts

Bioastronautics, our fourth and newest department, is just now in the course of organization It will be under the able leadership of Lieutenant Colonel David Simons, who is a pioneer in space medicine in his own right

In conclusion, I am certain that we all hope to return on the twentieth birthday of the department of space medicine to see what has been accomplished in the decade which will place man in space, and possibly among the planets

REFERENCE

I B O O Jr d Strughold H (dit rs) *Second International Symposium on the Physics and Medicine of the Atmosphere and Space* J h W l y a d So s N w York N Y (I p es)

Space Medicine of the Next Decade as Viewed by a Physician and Physiologist

HUBERTUS STRUGHOLD *M D Ph D*

I FEEL very honored to open the series of discussions of the protomembers of the department of space medicine—Dr Heinz Haber Dr Konrad Buettner and Dr Fritz Haber—on space medicine within the next decade as viewed by a physician and physiologist

Crystal ball gazing can include the following approaches or features logical extrapolation, imagination, speculation, fantasy, and illusions Sound crystal ball gazing, of course, always has to contain a dosis of horse sense In this, my space medical crystal ball gazing, I shall try to keep within the limits of logical extrapolation, imagination, and horse sense

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Dr St ugh ld s pr f ssor f sp ce m dicine a d ad is r for re ear h U S Air F rc Sch l f A tio M d i e Ra d lph Ai F rce B s T xa

Basically the time table in astronautics will be determined by the physical sciences technology and the rocket industry The predictions made from this side usually are realistic and therefore dependable despite this they occasionally unexpectedly become outdated by so called breakthroughs in this or that field and in this or another country

Recently the Select Committee on Astronautics and Space Exploration of the House of Representatives published a collection of predictions of 56 scientists engineers industrialists military officials and government administrators on the next 10 years in space These predictions ranged from new shock producing surprises to ultraconservative opinions Manned space flight played in these statements an important role And here is the area where space medicine enters the picture

In a life science such as space medicine predictions following a strict timetable are somewhat strange especially because the pace of the advance on the ladder into space will be determined in the technologic sector of astronautics in the first place as already mentioned We in the medical sector must carefully consider the various kinds of space operations (table 1) the pertinent types of vehicles (fig 1) and propulsion methods and their thrusts that are proposed by technology We then must have a sense for estimating their prospects and limitations from a medical point of view and must develop a research program that can improve the prospects and shift the limitations Only in this sense do I dare to make some predictions from the point of view of space medicine

A brief review of space medicine in the next 10 years can essentially be only a consideration of what should be done and what actually can be achieved during this period of time to further man s advance on the vertical frontier But I also should like to mention that some research that will be done during this time will not bear fruit until perhaps 20 years from now or even later

Space medicine like aviation medicine belongs in the category of industrial and environmental medicine Its industrial medical tasks are centered around the launching sites which exhibit all the hazardous features of a giant factory such as dangerous fuels accumulated en masse noise tight time schedules during countdown et cetera At present we are principally concerned with the toxicity of classical liquid fuels the propellants characteristic of the so-called first generation of rockets These will be replaced by exotic fuels in different states of aggregation In 10 years semisolid and solid fuels will be essentially the concern of the doctor assigned to duty on launching sites such as Cape Canaveral or Vandenberg Air Force Base The Minuteman rocket is the best known representative of this

development With this evolution of propellants, space medical toxicology will become exotic

As an environmental science, space medicine encompasses a much greater area of interest the biophysics of the environment of space, the artificial environment to be created in the cabin and the biodynamics of the vehicle moving to, through, and returning from the environment of space

Concerning the biophysics or ecology of the space environment, its basic biocidal quality is generally understood Within the next five years much of the exploratory efforts will be devoted to the study of the topographic and temporal environmental variations or differences in space They can present specific danger zones or time periods of increased hazards for manned space operations Several years from now we shall have sufficient knowledge about the topographic intensity distribution of James Van Allen's great radiation belt for biological evaluation Even now it can be said that—for safety reasons—the arena for manned satellite operations will be only 500 miles wide, reaching from 120 to about 600 miles The two cores of the radiation belt will be off limits for manned space flight whether or not orbiting through the corridor between them, that is, between 4 000 and 8 000 miles, is medically permissible will be a matter of navigation precision and further exploration

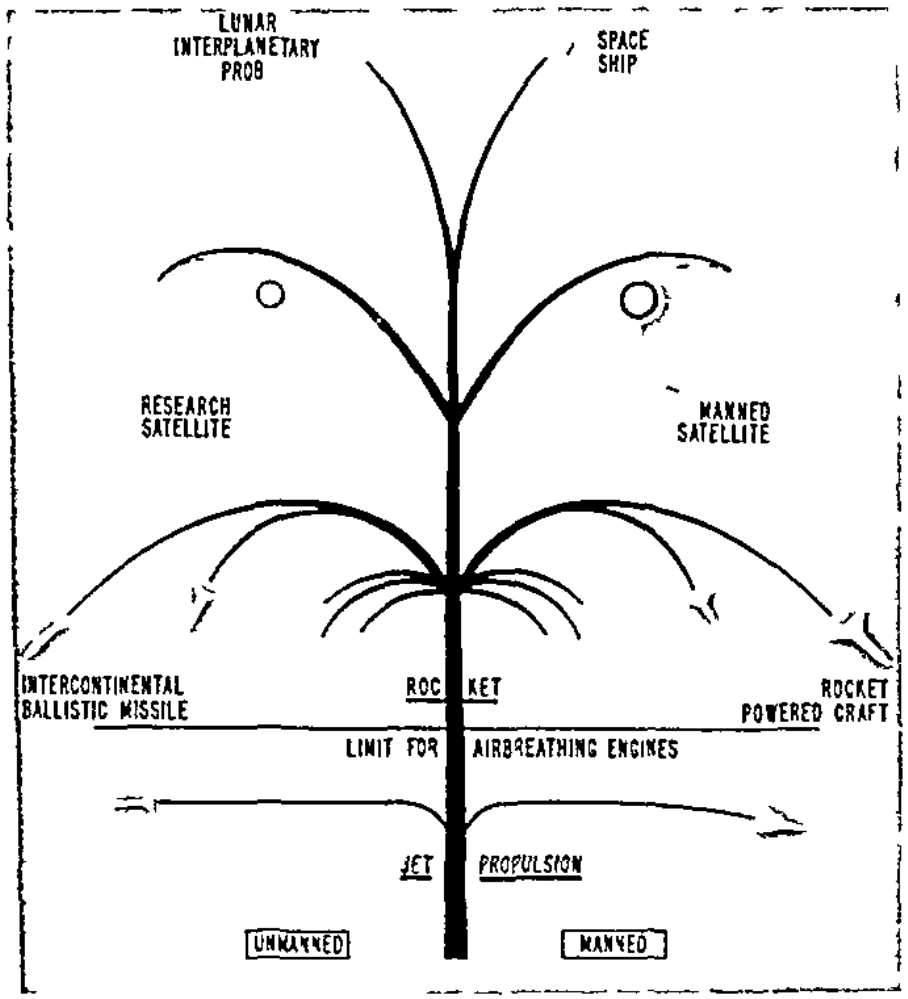
In contrast to these nearby space operations, this great radiation belt will pose even greater difficulties to deep space operations Nearby space can be defined as that region within which the earth s influence by its solid body, its atmosphere, and especially by its magnetic field upon the ecologic qualities of space is distinctly recognizable Beyond this region—determined by the outer boundary of the great radiation belt—we enter deep space which blends with interplanetary space at a distance of about one million miles, the region of the gravitational divide between the earth and the sun Manned deep space operations, whether with subescape or escape velocities, probably will be achieved around the end of the next decade Before this time, concerning the great radiation belt, we have to know what protective measures we have to take evasive action through the polar regions, higher velocity, shielding or a combination of all of them, or a combination o some of them In deep space operations the knowledge of meteor streams will also become important and will have to be explored by deep space probes The results of all these probes will enable us to draw up a space chart or space map about the biophysical conditions encountered in the void between us and other celestial bodies Such an ecologic cartography of space, or briefly spatiography, will to a great extent be based on considerations concerned with hazards for the crew and will become routine teaching material at universities and high schools For astronautics, advance knowledge of all of this is just as important as it is for the captain of a

TABLE 1 *Present and f tu e bas c stag s of h man fl ght*

	I	II	III	IV
Cl ss f cation of flight	Atmosphe c flight	Sp ce equiv lent fl ght	Satellite flight	Lunar t terpl net y planetary m on
Status of ehicle	Airpl n	Airpl e or pro j ct le	Sat llite	Space sh p
Char cteristics Environment	Trop sphere lower tr t osphere	Pa t l sp ce equivalent r g s f tm phere	Total sp ce equivalent regions of tmosphere nd near by space	Space
Dynamics	Aerodyn mics	Aer thermodyna m cs b llı t s	Celestial me ch nics	Celest al mech nic
Speed or veloc ty	Sub on c supers nic speed	Super ic hyperson c sp ds	Orb tal veloc ties	Escape velocities
G it tional cond t on	Norm l gr vity	Subg avity zerog a ity	Zerogra ty	Zerograv ty

ship to have information about the wind and water currents and routes of icebergs and cliffs in the ocean on his way to an island

The target islands in space are the moon, Mars, and Venus—the latter with a question mark Venusian probes within the next 10 years will have cleared up the question of whether or not it is true that in the direction of Venus we run into the outskirts of the solar corona, and if it is true that the temperature on Venus reaches biocidal levels due to a greenhouse effect in



Figu 1 Fam ly t e of ockets and space veh cles

its carbon dioxide enriched atmosphere, as Gerard Kuiper expects it to be We still do not know if Mars, probably the only sure target planet for exploration is a red and green planet, that is, are the green areas real or a visual contrast phenomenon Only from a distance of a quarter of a million kilometers are such dark areas as the Syrtis Major large enough to be recognized in their true color by the unaided eye Green or not green, it does not exclude the possibility of life on Mars In the future all astron omers should get their color vision examined also the astronaut should have normal color vision so that the information he brings or sends back about the optical world in space is reliable

There is no question that space medicine has already broadened our medical and physiologic thinking in the direction of a cosmic spectrum that will pay off and will be of benefit to the progress in earthbound medicine For example we do not find the word weightlessness" in the text and handbooks of medicine and physiology and yet numerous experiments on the statokinetic reflexes on the fall reaction of the cat in which weightlessness is involved have been carried out and described in the twenties It had been completely overlooked however until the first theoretical space medical papers 10 years ago brought it to our attention

Today, we observe almost a boom in weightlessness especially in the popular literature In scientific papers and lectures we begin to speak of a special category of gravireceptors and antigravireflexes The study of circulation under zero gravity —in which the hydrostatic pressure does not exist—will give us a better understanding of hemodynamics Following a lecture at the University of Maryland two months ago someone asked me the question What would happen to a baby born under zero gravity conditions? I think a speculative study of this question would be worthwhile especially when we consider that a child s biggest problem during its second year is the constant battle with the earth s gravity A hypothetical zero gravity baby brought after some time into the earth s gravity would probably first learn to swim and then later to walk following the developmental pattern in paleontology

Now let s take the closed ecologic system again Experimentation in this field is novel in the history of medicine and biology New methods for recording environmental factors such as oxygen and carbon dioxide pressures and physiologic processes are being developed all based on the principle of minimization in weight and miniaturization in volume and with the possibility of telemetry From this astroinstrumentation even hospitals will benefit I should like to remind you that a micromanometer to measure the blood pressure within the heart was developed by aeromedical scientists Colonel John P Stapp s biodynamic experiments on the rocket powered sled carried out in respect to the high G s during launching and atmospheric re entry also are extremely valuable for the medical analysis of automobile accidents One could relate many more examples

An entire medical astroglossary will be developed within the next 10 years which will not only serve its purpose in astronautics but also help to clarify definitions in terrestrial medicine

Several hundred years ago with the invention of the microscope and the subsequent discovery of cells and bacteria medicine learned about the riddles of the microcosmos Now with the development of giant rockets medicine in its youngest branch space medicine has the unique opportunity to aid tech

nology to open the gates into the distant world of the macro cosmos With this, the cosmic spectrum of medicine is complete

We live, indeed, in a wonderful era of science and technology, in a cosmic era for the first time in human history It is gratifying to see that medicine will play in this cosmic era an important, in fact a decisive role To witness this is perhaps the great est reward for all of those who have been associated with the foundation of space medicine in the past, and it will be a stimu lus for the medical and biological researchers of the future

I wish to conclude this presentation with a salute to Major General Harry G Armstrong who 10 years ago by founding the Department of Space Medicine, established an official platform for the start of these cosmic medical studies

Space Medicine of the Next Decade as Viewed by an Astrophysicist

HEINZ HABER *Ph D*

AN ANNIVERSARY is an excellent opportunity to look into the past, to assess the situation of the present and to attempt a forecast of the future We must be grateful to General Benson for having recognized that the tenth anniversary of the foundation of the department of space medicine is such a unique opportunity, and we also must be grateful to him for having invited to his headquarters all those who had a hand in the initiation of the field of space medicine a decade ago To us, then this opportunity is also an obligation I for one have given much thought to the ideas one should present on this occasion—ideas that live up to this obligation One almost feels like a parent who watches his child grow up Space medi cine has truly grown during the first 10 years of its life Today we might say that our branch of science while not yet fully mature, is certainly no less than a teen ager And like all teen agers our child is strong and promising but it also has its prob lems and growing pains

My mission is to give an astrophysicist's view of the next decade of space medicine I believe that this can best be done by bringing up to date a paper which was written shortly after the foundation of space medicine The title of this paper was Phasing and Coordination of Medical Research with Technical and Environmental Development [1] A re reading of this paper

Dr H b r i Sci ntif Con ltant Columbia Br dca ting Syst m L s Ang l Cal forni

shows that one essential error of judgment was committed namely the estimate of the development of the space flight and space medicine timetable has been too conservative The dreams of yesterday have become the realities of today much faster than anticipated So far as man s environment in space is concerned the most important and interesting change has been the recent discovery of the intense band of radiation enveloping the earth which now bears the name of its discoverer namely the Van Allen belt It is of particular interest to note that the Van Allen belt was discovered through measurements made with the Explorer satellites that is this discovery is a direct outcome of the fast growing space sciences

In order to assess the future of the space sciences and the role of space medicine in the next decade it appears expedient to subdivide the presumable development into three different phases namely the present the future comprising perhaps the period from two to eight years from now and the final phase that could possibly be reached at the end of the coming decade The types of vehicles unmanned and manned that are and will be used in these different phases are instrumented and animal carrying satellites lunar and planetary probes and in the manned variety high performance jet and rocket aircraft rocket air craft of the X 15 type with eventual orbiting capabilities permanent manned satellites and manned lunar ships For each of these vehicles we can assign certain geophysical and astro-physical types of environment that can be subdivided into es sentially four types The vehicles the types of environment the duration of exposure to these environments and their arrange ment within the three time phases namely the present the future and the final phases are shown in table 1

The four types of environment listed here can also be taken as the basis for a space medical research program for the coming decade In detail the characteristics of the four types of en vironment are the following

Type I This type the environment of the stratosphere and of the conventional jet and rocket powered aircraft existing today Characteristic are insufficient air pressure and oxygen partial pressure high g forces in certain maneuvers and difficult escape problems

Type II This type is the environment of extraterrestrial space in the proximity of the earth of satellites and their launching vehicles Characteristic are complete absence of air and oxygen radiation climate absence of diffuse illumination presence of unmitigated solar radiation (ultraviolet and x rays) cosmic rays behind the geomagnetic shield intense radiation from the Van Allen belt hazards from meteorit punctu weightle ne c l at n nd temp rature probl ms d g c nt d e entry and p p oblems of extrem s ty

Type III This type is the environment of extraterrestrial space of the lunar surface experienced by lunar probes and lunar ships Charac teristics are the same as for Type II plus these additional factors full isotropic frequency of meteorites and intensity of cosmic rays including possible bursts from short term excessive solar activities continued exposure to full solar radiation lowered gravitational field of the moon temperature extremes of lunar surface possible radio activity of lunar surface induced by secular cosmic radiation and escape problems of extreme severity According to recent data in tensity of radiation in the Van Allen belt is restricted to comparative proximity of the planet Earth

TABLE 1 *Pha g and co- d / p t h l gy d ron*

V h l	P ft	S ll	L h l	Plan ary h l
E m	Typ I	Typ II	Typ III	Typ IV
P	M d j — d ock f Expo ur m hour	P mane in u- m d and an l ying ll E p ur me d y y		
F tur		M d k ur af f h X 15 ype E po m m ut M d b l e- h l E p ur m h ur P ne man d ll E no ur d y —w k	I m d l prob Exp ur im k	
F l			M d l ar b p E p ur k	I rumen l pl ary p ob E no ur me on h y ar

Type IV This type is the environment of extraterrestrial space and of the surfaces and atmospheres of other planets Characteristics Same as Type II and III plus the physical and chemical factors govern ing the surfaces and atmospheres of other planets

All these geophysical and astrophysical factors of the space environment must be evaluated in terms of the expected duration of exposure This is particularly significant with regard to the radiation problem which is the only major space medical problem that has assumed an entirely new dimension as a result of recent discoveries

PHILOSOPHIC AND SOCIOLOGIC ASPECTS OF SPACE MEDICINE

I mentioned before that an occasion such as this anniversary implies an obligation, and I believe that I could not fulfill this obligation if I did not go beyond a mere scientific discussion

I hope that I may be permitted to delve into the philosophic and sociologic aspects of space medicine and space science as a whole I may be permitted to do this if only for one reason During the past five years a major portion of my time was spent in an area that I choose to call public science by which I understand the attitude recognition or nonrecognition of the scientific age particularly in our case the space age by the general public and also the relationship and the obligations of the scientist to the public The importance of public science" is highlighted by the ever increasing sums of public money that are spent on science in connection with the defense effort Today space medicine and space exploration receive a formidable share of this public money and this fact encourages me to look more closely into the relationships between space exploration and public science In particular I want to look into the question to what extent the space age and our work in it and for it are correctly understood by the public

What I have said so far is perhaps none too clear and I would like to clarify it by an example namely atomic energy The atom and its energy have entered the stage of our modern world as the most fearful and devastating force ever unleashed by man The potential military applications of atomic energy completely dominate the political situation of the world today In fact without atomic and hydrogen bombs the cold war would lose much of its fierceness and deep chill It is this aspect of atomic energy that justly captivates the mind of the world public If the word atom is mentioned everyone immediately associates with it the anxieties of the cold war the insidious dangers of radio active fallout and the horrifying prospects of a world wide holocaust of unleashed nuclear forces that could well wipe the phenomenon of life off the face of this planet But atomic energy is only a force of nature that is neither good nor evil only what we ourselves make of it renders it good or evil But the fact remains that the public relations of the atom are extremely bad and I am afraid that atomic energy will never be able to live down the deplorable circumstances of its birth as a useful power of nature And yet without atomic energy particularly without the still unharnessed power of fusion world civilization is bound to wither from energy starvation There exists an alarming discrepancy between the vital importance of atomic energy on the one side and its reputation in the mind of the world public on the other

How then does space exploration the second great scientific adventure of our time fare in this respect? Its beginnings were most hopeful The first true space project namely the artificial satellites originally was introduced to the world as a scientific experiment to be conducted in connection with the International

Geophysical Year (IGY) When in July 1955 the White House announced the "Vanguard" project to the world, it was most gratifying to all scientists to learn that man's first venture into space was to be a noble undertaking designed to enhance the progress of the sciences This development came as a tremendous relief to all scientists who had been worrying a lot about the reputation science had acquired in the public's mind, namely, that it was the prime role of science to be the handmaiden of warfare Instead, space exploration was to proceed as an integral part of the IGY, this great international research effort which was launched under the fortunate auspices of international co operation and peaceful intentions So far as public science was concerned, the years 1955 to 1957 were the golden age of space exploration even though not a single satellite had yet been launched

Then came the first Sputnik The entire situation changed overnight So far as the world public was concerned, the satellites were no longer tools of earth research No, they became symbols of a nation's capabilities to wage war and they became tools to impress the world with one's technical superiority and capacity for world leadership The scientific significance of these magnificent experiments was forgotten almost completely and the International Geophysical Year lost its charm What was destined to be the most glamorous showpiece of public relations for the IGY turned out to be a heavy liability True, the IGY remained a great scientific success but it had lost its power as a symbol of international peaceful co operation of our time The true meaning of satellites was lost too This was highlighted most succinctly by the terse caption given to the Sputnik story by a European news magazine The Propaganda Moon " And what is most deplorable of all, the noble idea of space exploration in the service of science for the benefit of mankind had suffered the same fate as atomic energy In the public's mind space and the atom are now both tools of power

SPACE EXPLORATION AND NATIONAL DEFENSE

As a realist I fully acknowledge the situation at hand This country has no choice but to make tremendous efforts in the field of space exploration in the interest of national defense and the world wide reputation of the United States as a major technological power I feel this way as a citizen and as a taxpayer But as a scientist with certain ideals I must confess that I deeply deplore this situation As scientists we are bound to feel this way not because we are hopeless idealists but because we deplore this situation in view of the future of science and its reputation in the public eye We are fortunate to live in a country that has always cherished the ideals of democracy and that has grown to be great because of them

Today science has become a public affair of the greatest importance but little is done to acknowledge this democratic fact On the contrary the present situation of space science has the public in a state of utter confusion about the role of science and scientists in our civilization We are scientists We know what we are and what our work is meant to be but we should worry about what the public thinks we are and what our work means If the public does not understand completely the motivations of scientists and the true meaning of science we shall not be able to secure public support for future projects unless they can be justified on the basis of military necessity Yet science is more than the design of military hardware but the public doesn t seem to think so Space science today is in an extremely exposed position because the world public is keenly aware of its importance as an international propaganda weapon There is considerable danger that science will suffer in the long run by such a stark misinterpretation of its true meaning in the mind of the public

LAUNCHING OF A LUNAR PROBE

Perhaps I should be more specific One of the space projects most likely to be attacked and accomplished during the next months or years will be the launching of a lunar probe that will circle the moon and bring back either through electronic relay or actual recovery a series of pictures showing the surface features of the other side of the moon that so far have been hidden from the exploring eyes of man This feat will probably be hailed as one of the most exciting and important results of space science The newspapers and broadcasting media no doubt will present these pictures to the public under these captions and we can t blame them for doing so After all such stories sell papers and soap Looked upon with strictly scientific eyes however these pictures will have little value as intrinsic building blocks upon which further progress in science can rest

There is an overwhelming probability that the other side of the moon will exhibit the very same selenological features as does the visible side The probability is so great that it is practically a certainty and no scientist in his right mind would spend a lot of money and effort in order to ascertain a certainty Everyone can enumerate thousands of other scientific experiments that are infinitely more promising and profitable Some might contend that these pictures will be of great importance because such a tremendously exciting and adventurous feat will show to the world what science of today can do Others might say that the e pictures will greatly appeal to the imagination of the public because exploring the hitherto hidden side of the moon is a perfect example of scientific ideals namely the exploration of the unknown It might further be argued that there

is hardly a better opportunity than this for making the importance of science understood to the world public I thoroughly disagree! On the contrary, these pictures will only add to the confusion of the public as to what science really is and what its aims are We would be doing a disfavor to the public and to ourselves as scientists if we would present these pictures as a great scientific result while, in our hearts, we must admit that they are not. Scientifically these pictures will be highly interesting at best, but not really constructive for the future development of knowledge

What will be of utter importance about these lunar pictures, however will be the question Who is going to bring them home first, we or the Russians! As a citizen of this country I want these pictures to be taken by us first, but as a scientist I admit to myself that these pictures will have a symbolic, rather than a true scientific significance

IMPORTANCE OF EXPLORATION OF PLANETS

To a lesser but still striking degree, the same arguments hold for the exploration of the planets which now seems to be the number one project on almost everybody s priority list Astronomers and astrophysicists from Galileo to Gerard Kuiper have amassed numerous data about the physical and chemical make up of the alien worlds in our solar system so that we can say with a fair degree of probability that none of them is equipped to be of absolutely vital interest in terms of human affairs In fact the scientific and economic returns from a large scale exploration of the planets at present cannot be expected to be compatible with the large sums of public money and scientific talent that would have to be spent on such ventures Within the foreseeable future such projects could be justified primarily in terms of the international reputation of this country

Of course there is the strong argument that the most important scientific discoveries have been made by exploring the utterly unknown and timid souls have always been accused of hampering the adventurous progress of science Naturally the history of science tells us that these truths are self evident and they have not lost their intrinsic value Yet, today, all these adventures and their honestly appraised prospective benefits must be weighed against the public funds and the national scientific talent that they require Such appeals to the history of science miss one important point In the past tremendously important discoveries were made by indeed exploring the unknown but such explorations were made at rather moderate expense The equipment used by Faraday in his discovery of electromagnetic induction could be bought for a few shillings in every hardware store It seems, however, that our forefathers have made all the cheap experiments and we are confronted with the expensive

ones This is most certainly true with regard to planetary explorations

There is only a moderate probability that an exploration of the solar system through direct human contact will produce scientific results that will profoundly enrich the volume of scientific knowledge with basically new ideas and truly change the course of scientific and human history Our present knowledge about the physics and chemistry of the planets while still meager cannot be so drastically wrong With the growth of science our chances of making the right predictions also have grown

In terms of human affairs we can say that there are only two important bodies in the solar system namely the sun which serves as an agent of stability and as a source of energy and the earth with its benign physics and chemistry The other planets are the chemical dungheap of the solar system and it is not likely that we shall find truly earth shaking scientific novelties in the masses of noxious chemicals that constitute the outer shells of the planets One could argue about the importance of studying the life forms that possibly exist on the planet Mars Terrestrial biology could possibly make great strides through the results of a comparative study of terrestrial and Martian life forms Yet similar results can be expected by biological research right here on earth if given a fraction of the support required for an expedition to the planet Mars I am not advocating that we leave the planets entirely alone in all the future yet today I don t see sufficient scientific justification that would warrant the expenditure Of course if planetary explorations are vital to our country s international reputation all scientific arguments become void and we are forced to visit Venus and Mars if only to show the world that we can do it too

All these problems must also be viewed with an eye to public science Space exploration has fired the imagination of the public and this fancy is constantly nourished by fantastic but nebulous promises of the space frontier Yet the question remains if it is wise to keep the public excited about man s glorious future in space If we promise the world a mountain of gold to be found on the planets while we know in our hearts that in all probability we will be able to bring them only a bagful of carbon dioxide from Venus if we do this space science possibly could end in a tragic public disappointment

Then of course there is the strong argument that space must be explored because it is there This argument is often advanced in the interest of public science particularly with regard to the younger generation There is nothing so it is argued that is better suited to appeal to the spirit of adventure and to the innate curiosity of young people than the space frontier

It is said that the exploration of space will cause many a young mind of today to pursue a scientific career, and it will do a great deal to make the next generation science minded No doubt there is a certain truth in this yet there is also a question of morality and scientific integrity Is it proper to fire the scientific imagination of young people by misrepresenting the true goals and ideals of science? True, it is simple to enthuse a young mind by telling him of a magnificent scientific future in which we shall explore the mysterious other worlds in the sky, colonize them and eventually conquer the galaxy It is much more difficult to inspire young people with the importance of unravelling the mysteries of the chemical structure of chromosomes or with the task of harnessing the power of nuclear fusion But it avails us little to take the easy way out If we want to make honest scientists out of promising young people, we must be honest ourselves We cannot give them a sense for scientific values if we fill their minds with fancy ideas of planetary colonization and interstellar explorations, while we ourselves know that for a long time to come such projects are to say the least utterly utopian If we want to raise a generation of true scientists we must give them a true picture of scientific ideals and of the seriousness of the scientific age Above all we must give them a true picture of the scientist so that they look upon us as mature and responsible people and not as interplanetary boy scouts that somehow failed to grow up Only then can we change the devastating opinion that many of the younger generation hold of scientists as was evidenced by a recent poll taken by Purdue University This poll involved a total of 25 000 twelve to fourteen year old school children across the nation A number of statements were presented to which the children were given the choice to agree or disagree One such statement was that all scientists are willing to sacrifice the welfare of mankind in the interest of their research Almost one third of the children agreed! This is a frightening result

Of course there are many publications and statements that truthfully present the meaning and importance of the space age to the public In its January 19 1959 issue *Time* magazine quoted an unnamed spaceman"

> We could concentrate entirely on our military developments and let the Russians have space to themselves Would we thus make ourselves impregnable? No because the rest of the world simply would not believe that we were impregnable It would look to Russia as the clear leader—and the battle would be lost before it was fought

This is an honest admission that does not invoke a nebulous scientific motive for our present space efforts The President s Science Advisory Committee in the Office of Defense Mobili

zation under the chairmanship of Dr James R Killian recently published a pamphlet entitled Introduction to Outer Space The last chapter contains a few valuable sentences about the importance of the space age

> I deed the scient fic opportunitie are so numerous and so invit ng that scientists from many countr es w ll certainly want to particip te Pe h ps the Intern tional Geophysical Year will suggest model for the int rn tional explo tion of sp ce in the years and decades to come
>
> Research in outer p ce affords new opp rtunities in science but it does not diminish the importance of sc ence on earth Many of the secrets of the universe will be fathomed n l bor tor es on earth and the progre s of our scienc nd technology and th wel far of the N tion require th t our regular scientific prog am go fo ward without loss of p ce in fact at an ncr ased pace

We must appreciate that these sober statements are not nearly as glamorous as the high sounding but rather meaningless phrases about man s glorious future in space but they most certainly make sense These statements were written by our scientific col leagues and we most certainly subscribe to them But we must not keep these truths to ourselves It is very unfortunate indeed that the public and particularly our younger generation are given so little opportunity to learn about the worthwhile goals of space exploration There are enough promising projects in the field of space science that lie outside the defense and propaganda domain There are scientific projects that truly benefit all man kind such as communications relay satellites the development of world wide television networks and above all the study and eventual control of weather and climate The challenging task of taming the unruly atmosphere of the earth cannot be solved with out the tools of space science and here is a task whose sci entific justification is above question

As we now enter the second decade of space medicine and watch the further development of the space sciences it will be more than ever our obligation to be certain of our motives Large sums of public money are available to strengthen our defenses and to uphold the reputation of our nation in the world It is a job that must be done without compromising before the public the ideals of science and the acquisition of knowledge As scientists we must be grateful that the present situation gives us a chance to conduct important investigations on a scale larger than ever before But we must also realize that there lies a tremendous temptation in this present situation of the space sciences Scientific research must be painstakingly honest not only in its execution and conclusions but also in its motivation

There is a great difference between science itself and its application to military hardware Yet through the recent his

tory of atomic energy and space technology, science and its military applications have become hopelessly entwined in the mind of the public so that they are often regarded as one and the same If this misconception is allowed to continue or even to grow, it will eventually destroy science If the younger generation continues to regard us scientists as people devoid of responsibility for the welfare of mankind, they will burn us at the stake like Giordano Bruno, but not because we have confessed to a scientific truth as we see it, but because we have corrupted the scientific ideals before the public

In my efforts to spotlight the situation today, I would like to remind you of a perfect example of a scientist in the person of Archimedes, the famous Greek mathematician who lived in the third century B C As you will recall, Archimedes became most famous for his engineering genius which he applied to the defense of Syracuse He was the first scientist in history who was called upon to serve his country during a war He invented a most efficient catapult to shower the Roman armies that overran his home town under the general Marcellus He constructed a levered grapple hook with which he lifted the Roman ships dropped and shattered them and he used a parabolic mirror and ignited their sails in the concentrated heat of the sun In the fulfillment of his patriotic duties Archimedes lent his knowledge to the defense of his home town in times of war but he never looked upon his ingenious military hardware as something worthy of the true spirit of science Rather he saw in them, as he called it geometry at play" The Roman biographer Plutarch who lived about 1 900 years ago, wrote about the admirable scientific attitude of Archimedes

> He possessed so lofty a spirit so profound a soul and such a wealth of scientific knowledge that although these inventions had won for him the renown of more than human sagacity yet he would not consent to leave behind him any written work on such subjects but regarding as sordid and ignoble the business of mechanics and every sort of art which is directed to practical utility he placed his whole affection and ambition in those purer speculations where there is no admixture of the vulgar needs of life studies the superiority of which to all others is unquestioned and in which the only doubt can be whether the beauty and grandeur of the subject examined or the precision and means of proof most deserve our admiration

REFERENCES

1 H b H Ph g d co- rd t of m d l r se rch w th t ch c l and m tal d l pm t In Whit C S d B o O O Jr (dit r) *Phys cs and M d cin f the Upper Atmospher A Study of the Aeropaus* U iver ity f N w M co Pr Alb q que New M x 1952 pp 575 581

2 V All J A. Ludw g G H R y E C. nd McIlw in C E Obs rv tion f h gh tens ty rad t on by satell tes 1958 alpha and g mm *Jet Propulsion* 28 588-592 S pt 1958

Space Medicine of the Next Decade as Viewed by an Environmental Physicist

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I AM thankful to General Otis Benson for the opportunity to be present at this celebration It is like a class reunion with our beloved headmaster Harry G Armstrong who founded the department of space medicine The opportunity to visit the working laboratories of the School of Aviation Medicine today convinced me that many research items I wanted to propose are already under consideration In addition I would like to comment on the previous remarks made by my friend Heinz Haber My comments are from a recent speech to a group of professors at the University of Washington on the question Why space flight?

Obviously discussion of the environment of a future space man would be futile if we knew there never would be one Manned space flight however will be based on a great number of unmanned space flights Any planning then involves the motive for space flight and its possible resources Whether we like it or not the first space vehicles came from military establishments Space has become a military proving ground and as Haber has shown it also became a proving ground for propaganda

Since the invention of modern mass fabrication in the early twenties our economy and world economy have suffered from depressions except during the preparation for war or during wars I do not know how economists explain this odd fact This leads to the necessity for an energy sink Energy sinks in antiquity were besides wars the pyramids in Egypt and Mexico and the Gothic cathedrals so we might as well use space flight instead to keep the use of science peaceful

Throughout history energy sinks have usually not been seen in their true nature by contemporaries It seems as though expenditures beyond a certain amount are just beyond comprehension and are therefore trusted to proper authorities without public debate This is the content of the third law of Parkinson Education of the whole population in natural sciences would be necessary before this acceptance by default could be altered

To the scientist space flight might be a dream ship offered to him for his perusal and in science is of course where the real

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D B p f f m l gy d l m l gy U y f W h g S tl W h g

progress might and certainly should be In meteorology, for instance we are in the position of an engineer who knows the temperature and the motion of an engine, but not its fuel input or its energy balance This lack of data could be amended by measuring incoming and outgoing radiation from the outside The next Vanguard is to try to do this

Following this digression on motivation, a historical remark seems in order What General Armstrong founded 10 years ago was certainly the first department of its kind in the western world, but was it really the first organization of its kind? I learned through unconfirmed press reports in 1950 about Russian tests with V 2's carrying animals in warheads returning safely by parachute My urgent plea, at that time, to bring the man who reported the story into this country, was left unanswered In the meantime a Russian scientist[2] has confirmed that these animal tests were started in 1949

My present task is to predict the state of the art ten years hence with respect to man's environment in space flight This environment will be a capsule protecting him from outer atmosphere or the lack of it cosmic missiles and rays, and heat and cold and providing him with a frame to cope with high G and no G Besides providing food, water, air, and waste disposal the capsule has to function as an observatory, as a communication center and probably as a control center for the ship

At present the following environs warrant discussion balloons rocket glider planes of the German type A 9/10 or American X 15 satellites around the earth and the moon lunar surface after landing Planetary landing and solar satellites are omitted here Table 1 shows some basic facts for the different stages All these environs lack an outer atmosphere Most of them are in the wake of cosmic ray primaries some may touch the Van Allen belt of strong ionization There is another part of space flight This is the waiting time before the actual shooting I have observed in both the German Air Force and the U S Air Force that crews are often left in extremely hot or extremely cold weather for quite long periods before take off

Instead of a full consideration of the many environmental problems I shall restrict my discussion to a few specific items that warrant special attention

TEMPERATURES

Except for those parts of its journey while leaving and reentering the earth s atmosphere the hull will attain a temperature in equilibrium with the possible inner heat sources, the solar radiation and the low temperature radiation from the earth, the moon and cosmos This holds mainly, also for a lunar base

TABLE \ S l l f p f l l p l

Cr f ar p d	M ph yp f fl h	Dur f fl h ph	G for xp d	T p ur	P y d	M
B ll	A /d	D y	1	RE	P	Ab
\15	A	M	10	W	Ab	Ab
	F fl p	H ur	0	RE V y	P	P
	R y h	H	2	h	Ab	Ab
S ll	A	M	10	W	Ab	Ab
	F fl p	U k	0	RF V y	P	P
	R y h	H	2	h	Ab	Ab
M b	A	M	10	W	Ab	Ab
	F fl p	D y	0	PE	P	P
	L l d g	M	1	RE	P	P
	L y	U \	0 2	RE	P	P
	Lun	M	1	RE	P	P
	R ry h	H ur	2	V y h	Ab	Ab

R d
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if it is not buried deeply Radiation equilibrium temperatures were discussed during the space symposium in San Antonio in 1951 Strangely these data were unknown to the scientists who made the surfaces of the Explorer and the Vanguard The electronic equipment needed to be protected only within the range 5 C to +45 C With a better white paint a more constant temperature can be achieved Active control should not be requested until all the rather inexpensive passive means are exhausted These controls require certain shape factors and paints Figure 1 shows the reflectivity of white paint and of aluminum for various emitter temperatures A constant temperature can best be achieved by white paint According to recent press reports the Russians achieved a satisfactory surface temperature of their space ships of +10 C

The partial differential equation of heat conduction $\frac{\partial}{\partial t}(\rho cT) = \nabla(\lambda \nabla T)$ (T=temperature t=time ρ=density c=spec heat and λ=heat conductivity ∇=spatial gradient or divergence) has a bewilderin number of solutions in space and time Surfaces hit by constant heat flow warm up proportional to $\lambda\rho c$ Heat waves in a medium move proportional to $\lambda/\rho c$ The final breakthrough of a heat wave through a thick slab of insulator comes quite suddenly a small change of the slab thickness might mean the difference between a harmless warming and a catastrophe

Convective heat transfer between the skin and the wall is either "forced" or free" (produced by density differences) The latter follows the G forces It would increase the wall to sl in transfer of heat during ascent and during the return ellipse It is tempting to assume that there will be air free insulators in the hull of the space ship This assumption helps, however, only where insulation is not very important to wit, in space Even at small air pressures, heat transfer through pores is reduced

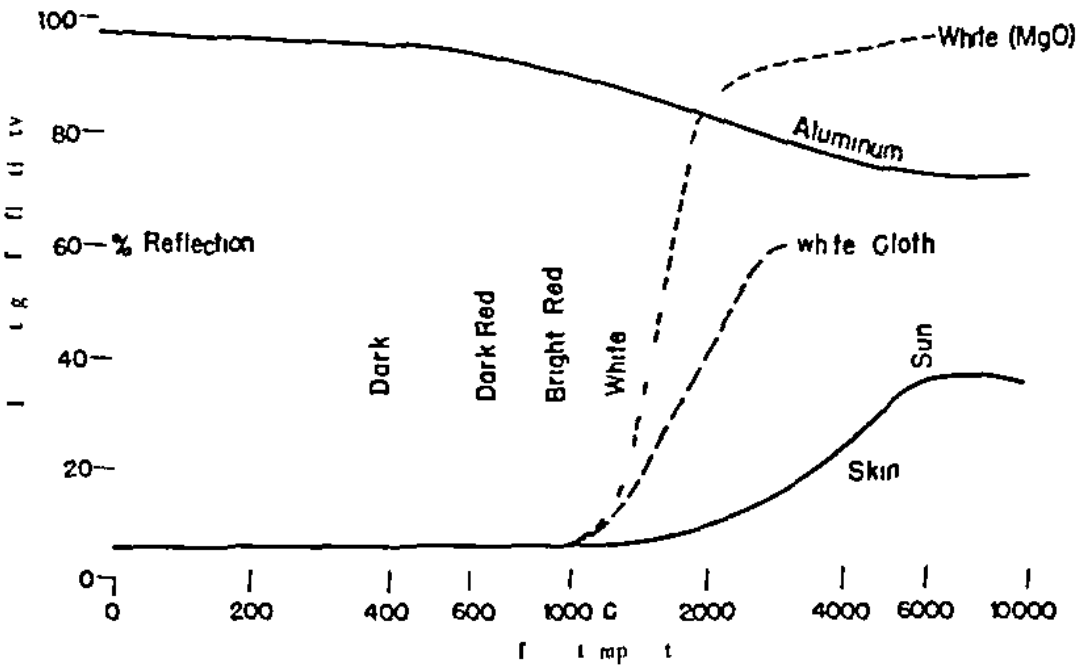


Figure 1 Reflectiv ty of diffe ent surfaces fo the ad ation f om black body radiators of diffe ent emitte tempe atu e Data nd cate the colo observed by the eye and the temperatu e of the sun

only if molecular free paths exceed the pores width but even then a substantial radiant heat flow bridges the gaps While at Wright Patterson Air Force Base in 1947 I invented a metal covering of the pore or fiber surface to block this transfer A metal layer 50 mμ thick suffices I learned, then that four patents were issued or were pending on devices to do just that None of them has been seen on the market

One of our environs is the lunar surface While at the School of Aviation Medicine I asked Dr Lettau for help in order to evalu ate the old Mt Wilson thermocouple data during lunar eclipses Using elaborate mathematical technics he found a surface layer of low density and conductivity about 60 cm deep, but below this he found high conductivity The superficial matter resembles face powder *in vacuo* while the deeper strata seem to be rock This holds for mountains as well as for maria I explained the dustiness" by action of cosmic ray primaries,

which penetrate to about the same level This theory has in the meantime been used by Gerard P Kuiper probably without knowledge of its publication in the 1951 space symposium and elsewhere [3]

Disregarding Lettau s and my data Gold claims that the maria are filled to a great depth with dust Recent Mt Palomar photographs show distinct features all through the maria thus throwing doubt on Gold s theory and verifying ours The lunar dust might be cemented together by vacuum effect as shown by North American Aviation It might therefore make excellent sturdy light weight insulating building material Houses could be made airtight by plastic sheets on the inside

Exposed parts of landed space craft and a moon house should have essentially the radiation equilibrium temperature As stated before the moon surface is not crushed because it suffers extreme temperature variations but its temperatures vary so much because it is *crushed* By *digging down* a meter or more one has direct contact with solid rock which has a constant temperature around 0 C Temperature control then should be easy

Man will be at the receiving end of the long chain of heat flows in a space craft He might be exposed to certain risks It is useless to say that he can tolerate or not tolerate a certain temperature without specifying the exposure time Many different laws control this effector versus time correlation Tolerance to extreme hot air is restricted by the reaching of extreme skin temperature for a certain time a condition which then leads to the chemical denaturation of skin protein commonly called a burn This chemical effect is strictly a rate process and depends on temperature and time Exposure to air at about 100 C attacks primarily the circulatory system and the limiting factors are the heart beat increasing core temperature and sweat load Again only the combination of temperature and time defines bearability Actual breakdown in these exposures can be dramatic (fig 2) extrapolation is difficult in view of the *circuli vitiosi* which start at a certain point

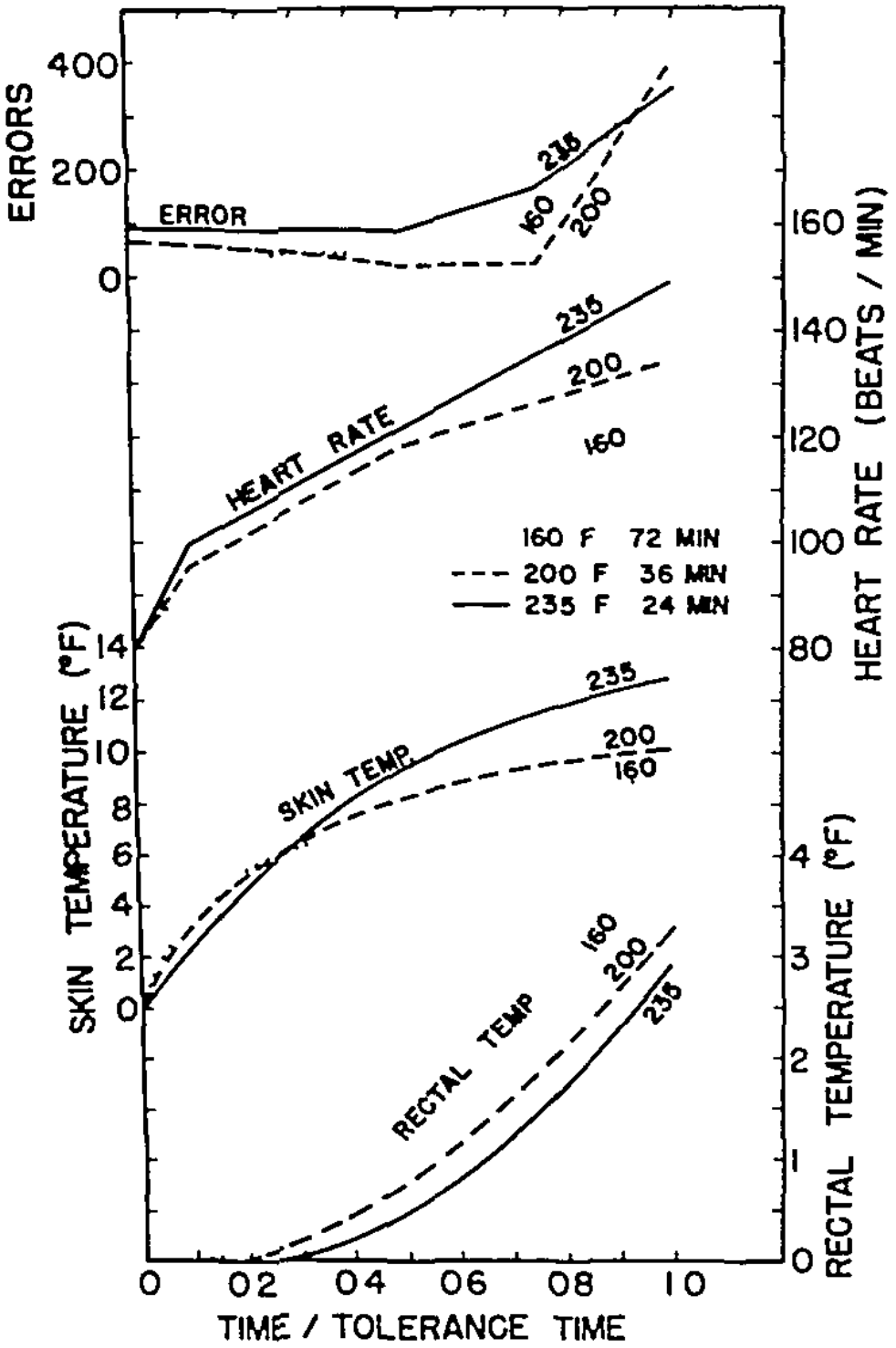
At longer exposures to even lower temperatures breaking points also are reported The National Park Service learned that it is unwise to leave the guards in Death Valley proper during the summer months this finding gives us another time temperature relationship

The environmental temperature conditions bearable for normal men clothed or exposed are given in figure 3

RAYS AND PARTICLES

Meteors have not yet harmed an existing space craft with one possible exception This fact should not make us overcon

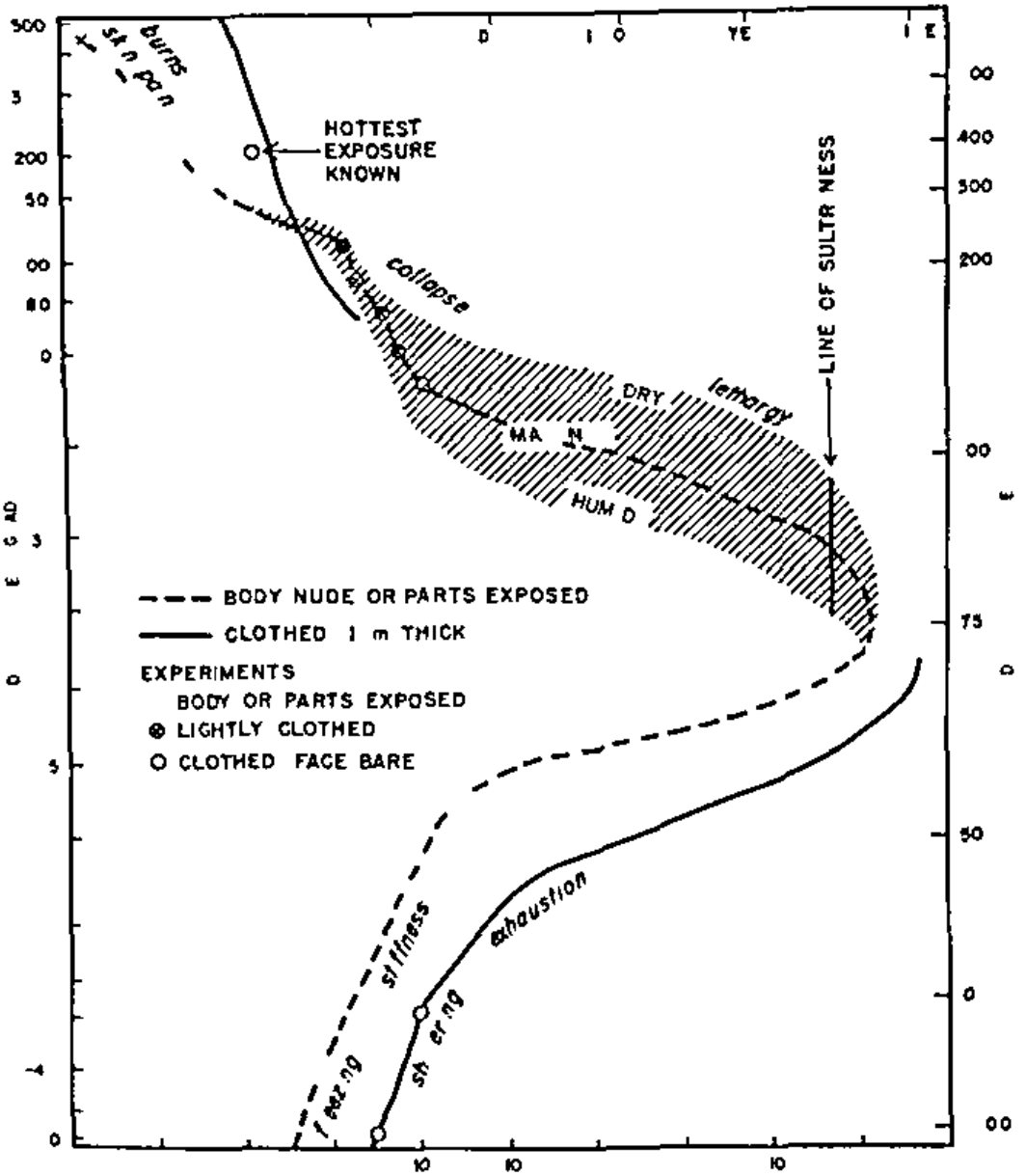
fident We are free of known meteor showers only about two thirds of the time, especially in February March and September The



F g e 2 Human sponse to heat exposu e Uppe cun e shous er o s L nk T a Based on expe iments at the Un versity of California at l o i g l by Blockley a d Lyman.[11] *(From Buettne* [12])

silencing of both radio transmitters of 1958 gamma is believed to be caused by meteors of the Aquarids shower [4]

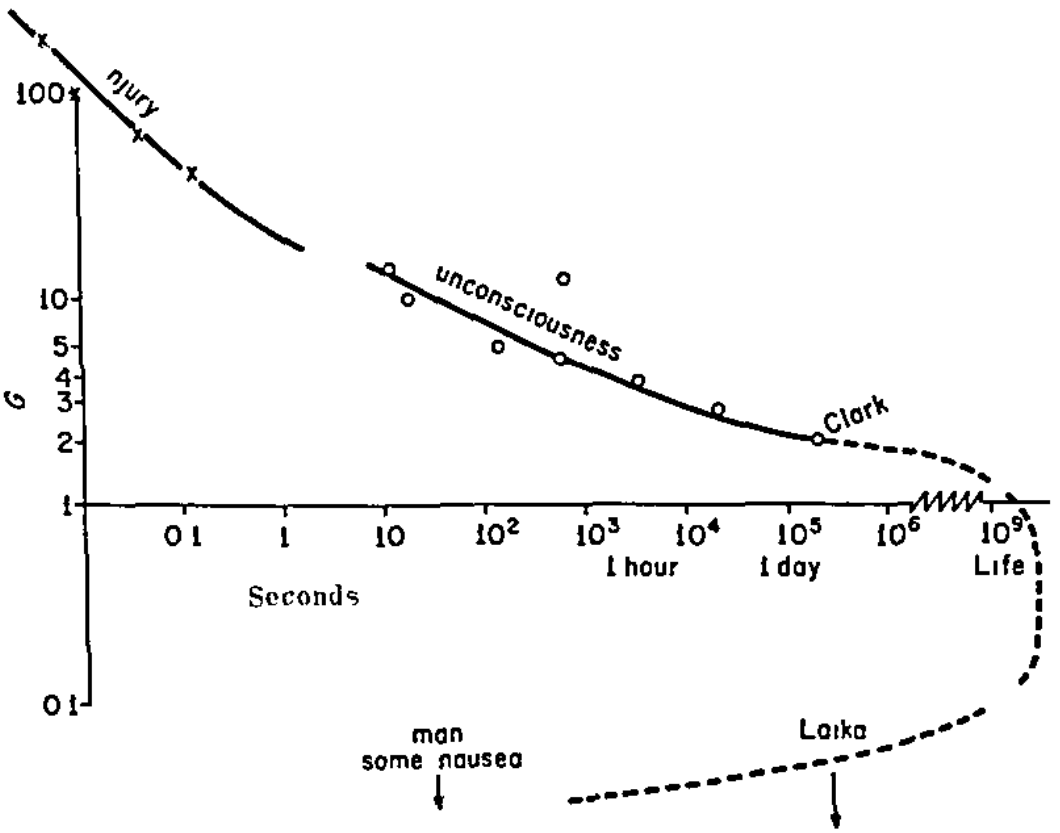
Outside the aeropause space craft are exposed to a multi tude of radiations and cosmic missiles Of these photons seem harmless except for possible x rays produced by solar electrons on the space craft hull or on the moon



F gur 3 S f he t d ld xp t m d f h lthy m l m t t w th b dy u h lly or p tly p d. R m f f m t f sal t l t d d t a a d wall ha d t l t mp tur H m d ty fl h u by hat h g M x N Y = h gh t d t f t mp t a d h m d ty N w Y k C ty (Aft B tt)

The spectrum of solar and cosmic ionizing particles runs from aurora producing protons of 10 eV to cosmic ray primaries ex ceeding 10 eV or 0 1 cal Lower levels of the exosphere are considered safe r m the tandpoint of possibly accumulated r units Specific effects from the impact of heavy cosmic pri maries however have been observed

The deadly Van Allen belt seems restricted to the exosphere beyond 6 000 km in height and to lower latitudes The most dangerous or hard belt is believed to consist of cosmic ray ter tiaries—probably protons—coiled around lines of the earth mag netic field This field is assumed to be invariant, which seems rather doubtful Field variations might well change the hard belt



Figu e 4 Safe G exposure times of man plotted in seconds Dott d li e s highly hypothet cal (Data for nea z o G eje to the dog n Sp tnik III and to experiments of Gerathewohl [17])

They would imbalance stable particle trajectories this usually would result in their loss Consequently this belt will have minimum strength during maximum magnetic fluctuations but the belt has been discovered exactly at that time If this hypo thesis is correct a stronger and more expanded ring is to be expected during a sun spot minimum

The moon s permanent cosmic ray bombardment continually produces neutrons which produce new isotopes This seems to be the reason why Kuiper claims strong radioactivity This ques tion of lunar radioactivity should be investigated more thoroughly On the one hand it is not easy to see why, in a billion years, there should not be an equilibrium between the incoming cosmic primaries and the induced radioactivity of the surface matter Meteors so far have not shown much induced radioactivity, but

the question is certainly not settled On the other hand the radioactive surface layer if any would probably coincide with the surface dust layer and it might be an easy task to clear this very lightweight matter from a large surface area

G FORCES

Human tests with near zero G of short duration show no alarming reactions in man On the other hand proposals of creating artificial G by spinning the space ship run into dangerous Coriolis forces Animal data for long time zero G also are reassuring But all these tests contribute nothing to the nightmares which plagued us 10 years ago such as H Haber s problem of no sleep because of fear of falling Lindenberg s statement about the hydrostatic pressure exerted by the upper part of the brain on the lower and my hint that at zero G the weightless masses in an inflamed intestine will be in the center of the tube insulated by foam from the tube walls There probably will be no answer to these questions until man stays long enough where G=0

Figure 4 shows G tolerances on the same kind of scale as figure 3

AIR AND WATER

Oxygen partial pressures above and below certain limits endanger life we find again a certain time versus effector relationship (fig 5) Any carbon dioxide conversion into oxygen has in the long run to adapt its respiratory quotient to that of our lungs

Man in a space capsule rebreathes all gases and vapors around him that are not exchanged from containers or by chemical processes Oxygen carbon dioxide and water will and can be controlled Valuable work has been done by submarine scientists on the possible accumulation of other gases such as CO radon and its isotopes and body gases All problems seem solvable many are solved Ion space charge in air is held responsible for many unexplained environmental effects on man Work on this aspect is in progress in many places

The water cycle in an advanced space ship will be about as manifold as in nature The algae will compound some water into starch Condensation or deposition (direct transfer vapor to ice) occurs on certain walls cooled through low temperature radiation into cosmos an ingests water in drink or food losing it partly in urine and feces partly through skin and lungs

The skin water transfer is now much better understood Of the secreted sweat and of water or solutions at less than 2 molar on the skin portions flow back by diffusion This osmotic diffusion is effected by an active process going on somewhere in the subskin It is restricted by the stratum corneum conjunctum

a keratin like layer only 5 to 10 microns thick This laver is the only protective barrier our body has against all chemical bacte rial, and other transfers

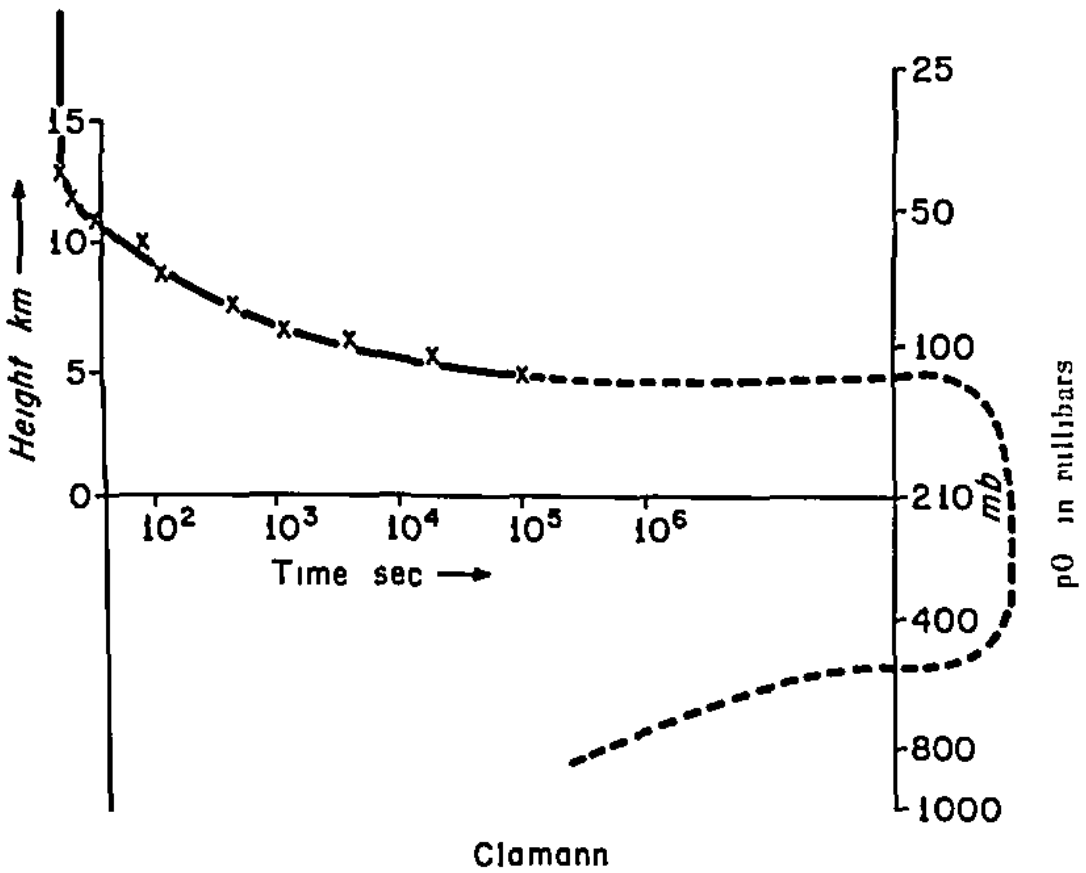


Figure 5 Safe oxygen expo u e times of man O d nat O_2 pa tial p ssu es in millibars (ight) he ght n km (left) Dotted l ne highly hypothetical.

The curves in figures 3 through 5 do not report new results but propose a new way of listing data This method might help to map the vast array of strange environs to be met by space pilots in the years to come

REFERENCES

1 P tk o C N *Park nson s Law and Other Stud es n Adm nstrat on.* H ght M ffli C mp ny Bo t M s 1957 p 24

2 k etz A G S m lt f b l g l p t me t ock ts nd Sput k II *J Av at on M d.* 29 781 784 No 1958

3 B tt k J K Th mal p ct f t l in pa —problems f th m l t d t n I Wh t C S d B ns n O O Jt (dito) *Phys cs and M d cine of the Upper Atmosphe a tudy of the aeropaus* U sity f N w M co P ss Alb q rq N w M co 1952 p 88

4 D mm t L F I *Sympo ium on Po sible U s f Earth Satell tes f Life Sci c E per ment* W sh ngto D C M y 1958

5 H bb A R ib d m

6 B t k J k Eff t f ext em h at and cold on hum k n lys s f t mp ture h ge c used by d ff r t k ds f h t appl cat on *J Appl Phys l* 3 691 702 J 1951

7 L t H O h budg f m d urf mp ur dur g lun l p G *f pur appl ata* 19 1 1951
8 B K J K Lun *Publ A t on Soc Pac f* 64 15 1952
9 G ld T Lun urf *M nthly N t Rov A t Soc* 115 585 1955
10 Wh ppl F L M m l p I S *nd Internat on l Symp um Phy nd M d cine f Atmospher nd Spac* S A T 1958
11 Bl kl y W V d Lym J *Stud f Huma T leranc for E t eme H at* U S A F T h l R p N 6022 1950 U S A F T h l R p N 6521 M y 1951
12 B K J K Th m l m d f I H b H (d) *Symp um F ont er f Man-Cont ll d Fl ght* U y f C l f L A g l C l f 1953
13 B K J K R m h *M b E gineer ng* 79 1031 1032 N 1957
14 M g E R M m m ur m f m 1958 lph d g mm ll *Planet ry nd Spac S enc* 1 27 1959
15 H b H P l mm
16 L d b g R P l mmun
17 G h w hl S J W gh l *A t naut* 2 32 34 74 75 N 1957
18 B K J K D ff f l q d w h gh h m k *J Appl Phy l* 14 261 268 Ma 1959
19 B K J K D ff f w p hr ugh m ll f hum k m l m *J Appl Phy l* 14 269-275 M 1959
20 B K J K D ff f w p hr gh hum k h m nd w h ppl f p *J Appl Phy l* 14 276 278 M 1959

Space Medicine of the Next Decade as Viewed by the Engineer

FRITZ HABER *D l g*

AT this celebration of the tenth anniversary of the Department of Space Medicine School of Aviation Medicine Randolph Field the titles of the papers presented reflect quite aptly the various fields of science that are working together in order to make space flight a success The department of space medicine originally consisted of representatives of those sciences If we investigate today the groups associations agencies and industrial companies that make up the team working on space flight we see a similar representation Space flight really encompasses all fields and not one company or government agency alone is able to carry out the necessary work without asking for help from other fields

The title of my paper is not a paradox therefore when it combines two sciences which apparently have nothing to do with each other that is medicine and engineering Such a combination is not a strange phenomenon as far as space flight is concerned In this presentation I would like to discuss some

D H b w h h Ly m g D AVCO Ma uf ur g C rp S f d C

of the correlations that exist between the two fields I would like to show how requirements of one field impose restrictions on the other and how advancements of the state of the art of the one field simultaneously permit the widening of aspects in the other

The title further implies that space medical problems and their relation to engineering in the next decade should be discussed It is, of course, always difficult to make predictions Now, if one doesn t know how to predict something, it is always easy to extrapolate or observe the trend of events during the past and project this same trend into the future Therefore instead of making a prediction, I would like to make some extrapolations I believe I should give you an example of what I mean with this extrapolation

About 20 years ago it was a major accomplishment to fly at altitudes of about 40,000 feet At that time aviation medicine was very much concerned with keeping a man alive at such altitudes where oxygen is not as plentiful as at sea level Scientists were studying the associated physiologic phenomena in order to learn as much as possible of what happens to man under conditions of oxygen deficiency New equipment had to be devised to enable man to live safely at such altitudes Later oxygen equipment and pressurized cabins were perfected so that in the decade 1940 to 1950 flights at about 20 000 feet became routine first in military and later in commercial operations In the present decade military operations at 40 000 feet became commonplace and those altitudes are now becoming the airways for commercial aviation What was a major accomplishment 20 years ago is now something that anyone can do by flying in a commercial jet airliner from New York to Paris at 40 000 feet

What is the essence of this example? It shows two things First we see how a major feat of yesterday becomes a routine today It is not difficult to predict that similar things will happen in the area of space flight The example also is significant in another way It certainly shows how the perfection of the state of the art eventually removed all restrictions and limitations that existed in this area The problems of aviation medicine 20 years ago hardly exist today because the final engineering of the technical article practically removed the basis for the existence of the problem The problems of 20 years ago were primarily associated with the then existing technology

Space flight today is comparable to the early history of aviation Simply look at the crude way in which we attempt to accomplish space flight in order to see this point Very soon we will put a fellow into a cramped little capsule, shoot

him into the sky with tremendous force let him fly helplessly around the earth then on his return we let him collide with the atmosphere where again he is subjected to tremendous forces together with roasting temperatures Finally we drop him at a landing spot whose selection is only under very little or no control At present this is the best we can do The state of the art is just about far enough advanced so that we can risk sending a man into space It is obvious that we have to do much better if we want to make such flights a daily routine

Now coming back to predictions and extrapolations I believe it is safe to say that space flight space medicine and its associated problems will go through similar phases of development as did aviation and aviation medicine Many of the space medical problems we are fighting today result from today s technology The advances of the state of the art may alleviate many of those problems and will make space flight as similarly routine as the flights today at 40 000 feet and at almost sonic speeds from New York to Paris It not only is likely but practically certain that one of us in this audience will go out into space without meeting the rigid medical requirements that must be met today in the selection of a space pilot I do not know of course if it will happen in the next decade but it is certain that steps in this direction will be taken

May I emphasize that I do not wish to imply that engineers are the ones who will solve all medical problems They just do not roll up their sleeves design a better gadget and tell the medical man to go home Just as aviation medicine has made excellent contributions to the general science of flight and has set goals for the engineer in the same way space medicine is a vital factor not only today but also in the future The engineer will always look to his space medicine teammate for understanding of the human problem and for guidance as to human limitations

SPACE MEDICINE PROBLEMS AND THE ENGINEERING ART

So far I have discussed generalities Now I would like to introduce a few areas where I can illustrate the correlation between the state of the engineering art and space medicine problems I want to explain with a few simple examples why we have the medical problem today and what must be done to alleviate or even remove it

Take for instance the acceleration during launching which for an orbital vehicle is approaching the human tolerance It is quite useful to consider the reasons for the high acceleration we employ today and then consider the possibility of reducing these accelerations to a level that is tolerable for a more average person rather than for a specifically selected man

It is common knowledge that today's rockets are burning fuel at a tremendous rate To bring a satellite into orbit, a major portion of the weight of the entire rocket on the launching pad is composed of fuel It is obvious that to raise a rocket from the launching pad, the thrust must be greater than the weight Let's assume for the purpose of this discussion that we have a rocket weighing 100 tons and that the thrust exceeds this weight by 50 per cent The thrust is then 150 tons This is another way of saying that the initial acceleration is 1 5 G's

If it were possible to design a single stage rocket to put the satellite into orbit, then approximately 95 per cent of the take off weight would be fuel that is, 95 tons This means, of course, that at burn out, after all the fuel has been consumed, the final weight that remains is only 5 per cent of the initial weight, or 5 tons Since, however, the thrust of the rocket engine is undiminished and remains at 150 tons, we now have a tremendous acceleration A force of 150 tons is now propelling a mass weighing only 5 tons, resulting in an acceleration of 30 G s The tremendous fuel consumption reduces the total weight so drastically that we finally obtain those high accelerations You can see clearly the correlation between the engineering fact of fuel consumption and the medical fact of the acceleration imposed on the man in the vehicle

Technic of staging Quite fortunately for the poor prospective pilot, it is almost impossible to build a rocket that has an empty weight of only 5 per cent of the total weight It is very difficult to obtain such light structures and rocket engines The engineers, therefore, long ago developed a trick known as "staging that permits higher structural weight percentages This technic is based on the fact that the entire structure does not have to be lifted into orbit but that parts of it are jettisoned at lower altitudes and velocities In this way relatively more structural weight and payload is permissible on the launching pad and of course remains at burn out of each stage Consequently, the very high accelerations are not obtained This is now a case where the shortcomings of technology are helpful to the human factors

Figure 1 shows the reduction in peak acceleration because of staging It shows how drastically the peal is reduced if two stages are used instead of one and how further reduction can be achieved by going to three stages It is obvious, of course, that the duration of the acceleration is increased by the use of multiple stage rockets because the time integral of acceleration must be the same in order to obtain orbital velocity

As pointed out before, today's rockets are *burning* fuel in large amounts, and it has been shown how *fuel* consumption during the flight reduces total weight, *thereby* increasing the

him into the sky with tremendous force let him fly helplessly around the earth then on his return we let him collide with the atmosphere where again he is subjected to tremendous forces together with roasting temperatures Finally, we drop him at a landing spot whose selection is only under very little or no control At present this is the best we can do The state of the art is just about far enough advanced so that we can risk sending a man into space It is obvious that we have to do much better if we want to make such flights a daily routine

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Another way of making accelerations more tolerable for man would be to control the thrust of a rocket engine in such a manner that the thrust diminishes in proportion to the decreasing weight as the fuel is consumed Rocket engines today, although perfected to quite a degree, are still rather crude The process of providing thrust from such a device constitutes a barely contained explosion in a suitably formed compartment Things become more difficult if attempts are made to control or throttle

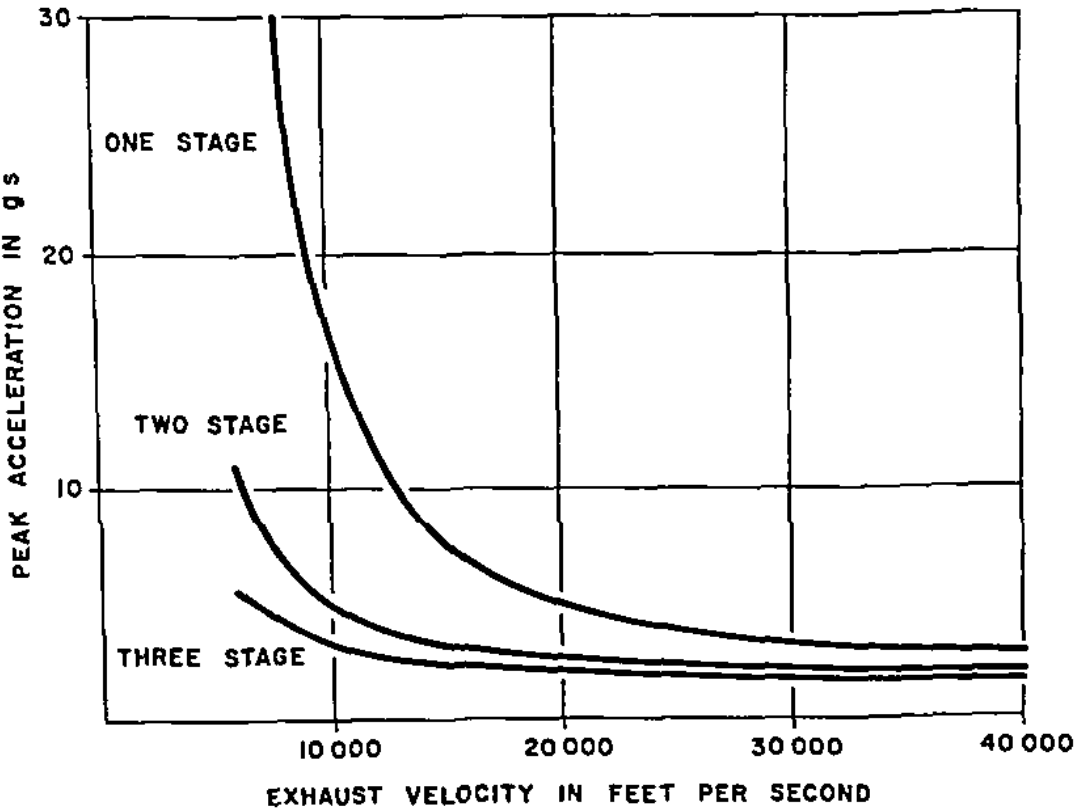


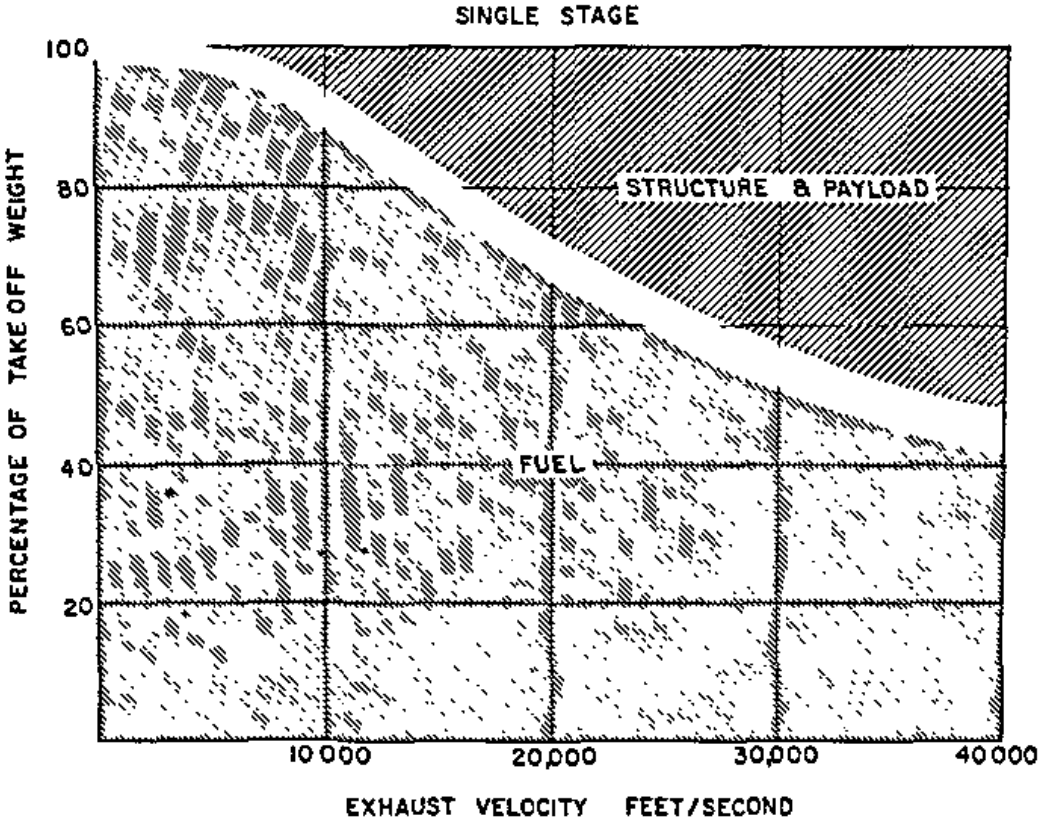
Figure 2 Peak acceleration as function of exhaust velocity

the thrust First attempts were made in this direction for the rocket engine of the X 15 Similar procedures may be applied to large rocket engines not only to control thrust but to control acceleration and flight path as well

Low weight factor Everyone associated with rocket engineering and space flight is aware that the low weight factor of all rocket devices is of utmost importance If we plan today to put a man into orbit, all the equipment necessary to sustain the man s life must be as light as possible Excessive weights are out of the question This of course, imposes severe restrictions on all equipment If it were possible to relax these restrictions life for the man in the orbital vehicle could be made much easier

As pointed out previously, most of the rocket s total weight constitutes fuel In figure 3 it is shown how the weight distri

bution depend on exhaust velocity This figure shows the weight distribution for a single stage orbital vehicle and it clearly indicates how much more structure and payload could be installed if the exhaust velocity could be made higher Today with exhaust velocities in the order of 8 000 to 10 000 feet per second only a small percentage of the total weight can be made available for payload and structure while at higher exhaust velocities this percentage increases rapidly



F w 3 W ght d t b t f b t l h l

Again staging helps significantly in this respect this can be seen from figure 4 which now the weight distribution for multi stage rockets It is evident that today only staging grant u enough weight allowance for payload and structure to r al e pace flight po sible Increas s in exhaust velocity would su stantially improve the situation

It hould e noted that staging is a necessary evil It certainly does not improve the reliability of the vehicle as past experience has shown It is quite clear that a sin-le-stage rocket i much simpler because nothing can be wrong with the gad-et which are not there For the time being however we have to live with multi stage rockets

It is beyond the cope of this paper to make predictions as to when such increa e in exhaust velocity may be achieved

The chemical fuel rockets with the presently known fuels already make the best use of the available energy Significant increases in exhaust velocity with such fuels are not very likely Other means of accelerating the propellant gases are being studied Some promise appears to come from a new field which is called "magnetohydrodynamics" The applications of this new field of science are fairly new and are being applied quite effectively The behavior of gases is studied under conditions of very high temperatures where, through ionization gases become electric conductors A gas in a magnetic field behaves then exactly like any other current carrying conductor

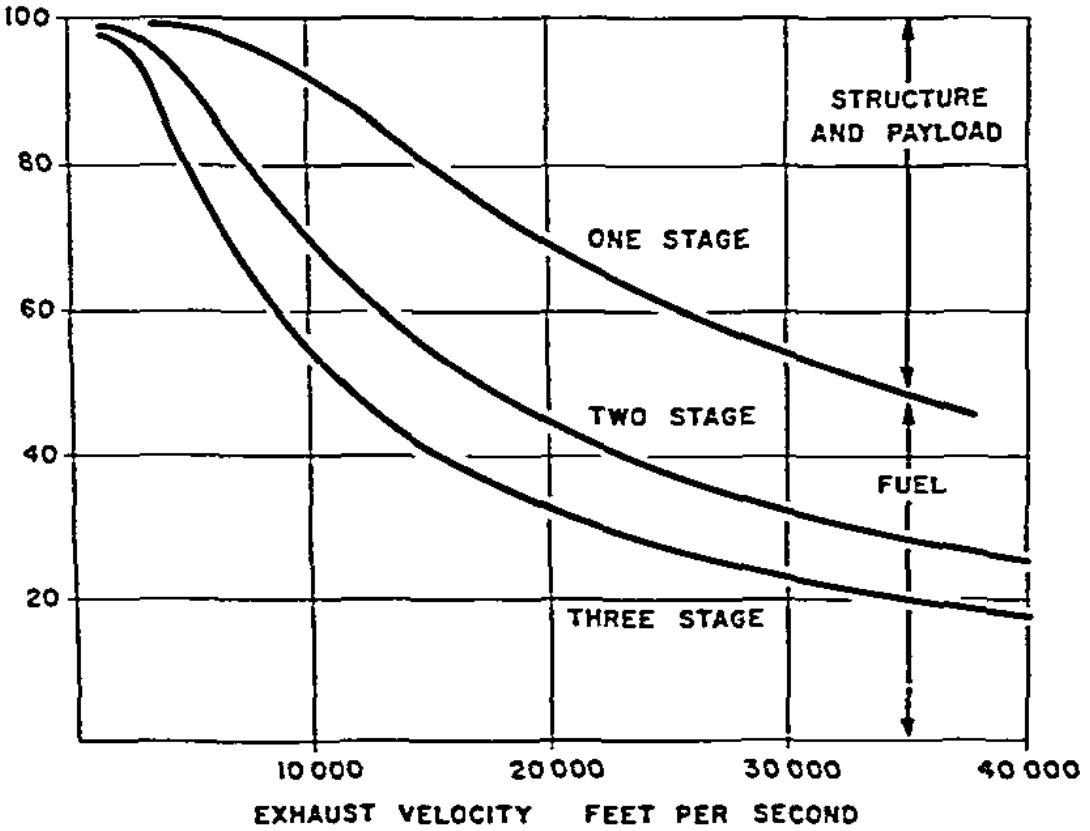


Figure 4. Weight distribution of orbital vehicles.

as for instance a wire in an electric motor It is possible then to accelerate the gas through magnetic forces It is still too early to say how much improvement really can be expected from this field It is interesting to note that this new field has strong relations to astrophysics where magnetohydrodynamic forces have been known for quite some time as major forces acting in the universe

The problems discussed so far were all concerned with the launching of the vehicle A solution to those problems appears rather simple In contrast, the problems of re-entry are formidable

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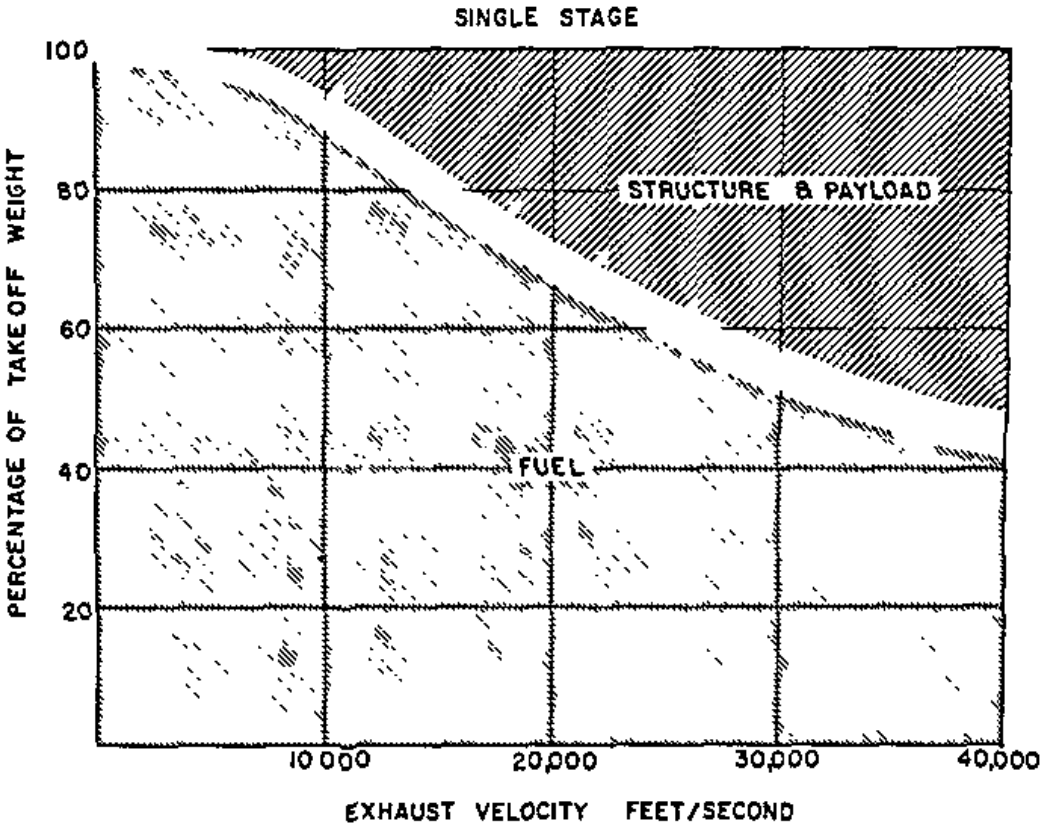


Figure 3 Weight distribution of bipropellant vehicle

Again staging helps significantly in this respect this can be seen from figure 4 which shows the weight distribution for multi stage rockets It is evident that today only staging grants us enough weight allowance for payload and structure to make space flight possible Increases in exhaust velocity would substantially improve the situation

It should be noted that staging is a necessary evil It certainly does not improve the reliability of the vehicle as past experience has shown It is quite clear that a single-stage rocket is much simpler because nothing can be wrong with the gadgets which are not there For the time being however we have to live with multi stage rockets

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eration experienced in the terrestrial atmosphere is shown in figure 8

You can see that Mars will pose the smallest problem as far as deceleration is concerned The reason is, of course, that the atmosphere is rather thin and gravity is only about one third of a terrestrial G Venus is about the same as Earth, as was shown in figure 6, but Jupiter certainly presents a problem A pure drag vehicle would produce too much deceler ation and lift is absolutely necessary Sustained flight at low velocities appears quite troublesome because of Jupiter s high gravity

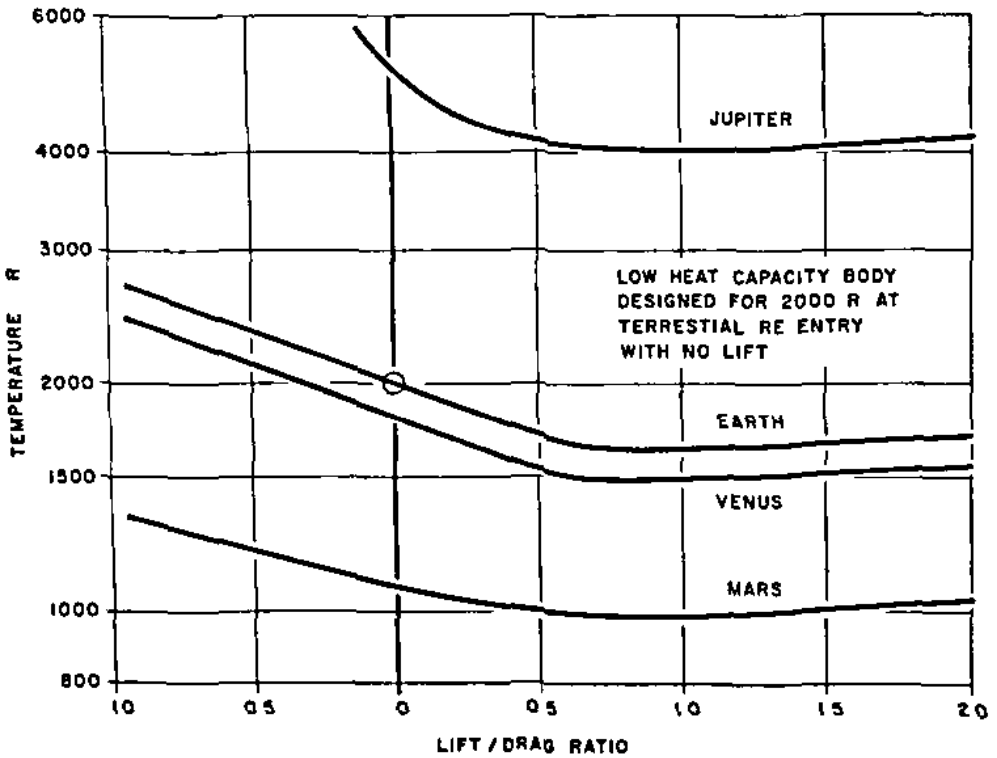


Fig e 9 T mpe atu at e e t y nto planeta y atmospheres (After Chapma [1])

Aerodynamic heating in the various planetary atmospheres is also quite different from the heating in the terrestrial atmos phere Let s assume that a nonlifting vehicle is designed to reach 2000 Rankine upon re entering the atmosphere of the earth If we have a low capacity structure, the temperature will vary with the application of lift as explained before The same vehicle in other atmospheres will attain temperatures varying in about the same manner as is shown in figure 9 The temperature level however differs greatly depending on the planet Again Mars offers the least difficulties with Venus, earth and Jupiter following Jupiter in all respects certainly appears to be a forbidding planet

I have attempted to give you a brief glimpse at the problems of re entry Their implications relative to a manned satellite need no further explanations Again there is a strong correlation between the state of the art and space medical problems Today the only way to control re entry is by means of aerodynamic forces Drag being the simplest one will be used first Later certainly lift will be employed as soon as the problems associated with lift generation for practical applications are mastered In the future when engine thrust can be used more efficiently not only for launching but also for re entry and when the generation of forces through other means than aerodynamics becomes feasible the problems of a re entering vehicle and its consequences for its occupant become greatly simplified I am confident that in the next decade we will see such progress where refinements of the state of the art will take place It is also clear that major breakthroughs are required to take space flight out of the adventure category and make it a practical routine

REFERENCE

1 Champ D R *An Approximate Analytical Method for Studying Entry into Planetary Atmospheres* National Advisory Committee for Aeronautics Technical Note 4276 Washington D C May 1958

THE EMOTIONAL SYMBOLISM OF SKIN

When one asks a patient with a skin disability What does your skin mean to you? one often gets the reply Well it's what keeps me together It is me When it looks good I feel good When it looks bad it gets me down or I feel inferior and of course those suffering from acne often say I want to get away from everything It embarrasses me and I have a feeling of being dirty or inferior The skin is also charged with emotional symbolism This is clearly shown in phrases such as getting hit under the collar symbolizing rage I am itching to get my hands on him signifies desire for an aggressive act Phrases like my hair stood on end and I am in a cold sweat indicate the tense anxiety and being taughtened or thin skinned denote degree of emotional sensitivity The expression I would not want to be in his skin for anything is the same as saying I don't want to be that person In this respect the skin can also be regarded as if it were the total personality —J Fotko The Changing Pattern of Dermatology *Medical Proceedings* (Johannesburg) 10 January 1959

THE AEROMEDICAL REALITIES OF SPACE TRAVEL

M S WHITE *Brigadier General USAF (MC)*

IT IS AN HONOR and privilege to address this great congress of aviation medicine as a representative of both the Aero Medical Association and the United States Air Force I bring to you the warm felicitations of both organizations and their best wishes for a most successful meeting

The past of aviation medicine and its progress to the realities of space travel cannot properly be discussed from the point of view of one nation alone You need only be reminded that the need for and the recognition of aviation medicine as an organized science began on this continent with the interest of many groups Therefore it is most fitting that this Third European and First World Congress of Aviation Medicine take place in such an historic environment and under such appropriate auspices

It was in Europe in the war of 1914 1918 that flying operational experiences taught that human error rather than enemy action contributed to the majority of aircraft losses This led to the rapid development of aviation medicine as a science to assist the flyer Following World War I aviation medicine was firmly recognized at the first international conference in this specialty in Rome in 1919 Later in this country in nearby Brussels in 1935 there was an outstanding conference on an important function of aviation medicine This was the Third Congress of L Aviation Sanitaire

In the delightful and stimulating surroundings of Louvain we are aware that this is the birthplace of many notable contributions to science Of interest to flight surgeons concerned with the use of oxygen and other gases was the work of a Capuchin friar Jean Baptiste Van Helmont who was educated in Louvain in the sixteenth century This learned scholar originated the word "gas" which he derived from Paracelsus use of the Greek

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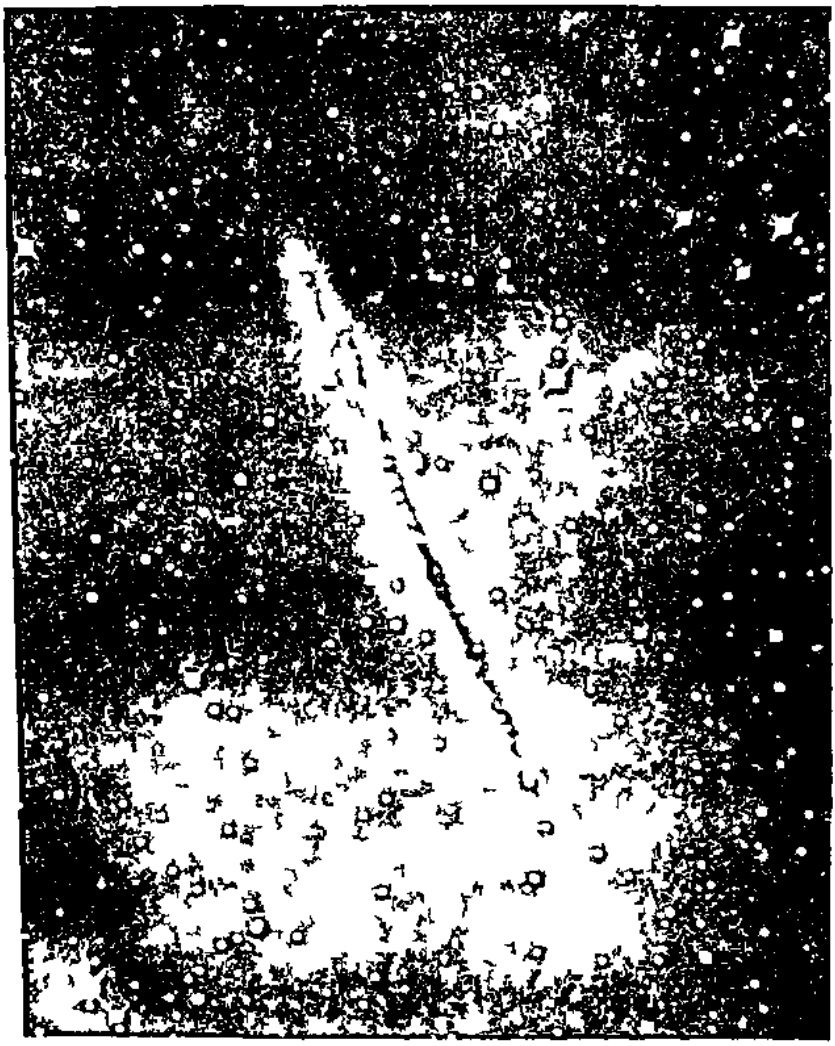
consider that just one sin_le light year calculated at the speed of light of 186 000 miles a second is equivalent to a distance of 5 8 million miles The objectives of this sky survey were to increase man s knowled_e of the celestial bodies and other phenomena in the Milky Way the galaxy of which the solar system containing the earth is a part In figure 2 i the cone nebula photo_raphed with the more powerful 200 inch reflector of the Hale telescope which can double the ran_e of penetration



F g D t l f c b l Phot g ph d u th 200 h Hal t l p

int pace to the almost incomprehen ible distance of two billion light ve ir If throu h some miraculous development man could project him elf from the earth at the speed of li_ht he v ould not reach the vicinity of thi beautiful area depicted in the heavens for 0 million centurie Ba ed on pre ent concepts of spice and time thi _oal of pace flight is beyond our attainment However it doe illu trate ho inclusive and incorrectly we frequently u e the term) ce and pace flight When we

draw closer to the earth and direct our attention to this planet's nearest star, the sun, which is only 8 3 minutes away by speed of light time, or a mean of 93 million miles, we see that again we are forced by time and space factors to relatively limited space travel Under present concepts, a trip to the planet Pluto located in our solar system but farthest from us and the sun—a distance of five and one half hours at the speed of light or 50 years in supersonic flight—would be beyond one man s active lifetime [1]



Fi r 3 Sp al n bula n A d o eda A galaxy similar n hape to the Milky Way galaxy n ub ch our sola yst m located

Perhaps in some future generation a reorientation in, or a totally new theory of relativity will permit true space explor ation to other areas within our own Milky Way galaxy, or to those thousands of other galaxies now measured as billions of light years away We must recognize the futility of this type of space travel tod y and return from these metaphysical regions to

present day atmospheric flight and the role of aviation medi cine The distance between any neighboring galaxy system averages two billion light years of distance A representation of what our own Milky Way galaxy may look like when viewed from afar is seen in figure 3 a photograph of a spiral nebula in Andromeda a neighboring galaxy It is not unlike a large wheel seen edgewise with rounded streamline projections at its hub on either side Buried in a similar wheel like formation of the Milky Way, which has a diameter of from 80 to 100 thousand light years and a thickness of 10 thousand light years is our own solar system A manned mission from earth would have to travel 15 000 light years just to cross the Milky Way s nearest frontier before it could be claimed that intergalactic travel had commenced

Our immediate attention must be focused on a very small area of the universe that is our own frontyard Though we may speak facilely of space travel we are really referring only to the further extensions of height duration and speed that have always been the goals of man s increasing penetration of the atmosphere

The atmosphere of the earth can be considered for significant functional purposes to extend to 100 miles with approximately 99 per cent of its mass within 90 miles of the earth (fig 4) The remaining 1 per cent may extend from 6 000 even to 60 000 miles dependent on various interpretations of molecular dis tribution At the present man has conquered atmospheric flight and space equivalent flight The next important step prior to entering true space will be circumplanetary flight at the outer fringes of the atmospheric layer The attendant medical problems of such flight of which this audience is well aware have been analyzed and most have been solved Many of these problems will be discussed at the meetings of this congress Progressively the objectives are clear and a timetable has been drawn Fol lowing earth satellite flights and the unmanned luna probes the next goal of man will be the moon a distance of about 240 000 miles or 1 3 seconds if measured at the velocity of light or if measured in projected flight times one day to one week dependent on the trajectory of flight and the initial veloc ity of the vehicle Figure 5 is a photograph of the moon at 14 day stage with a 48 inch Palomar telescope A closer view of a portion of the surface facing future explorers is seen in figure 6 made with the more powerful 200 inch Hale telescope

The successful accomplishment of lunar flight will pave the way for further exploration and interplanetary travel which while similar from a mathematical and medical point of view will be more extensive in having a greater number of major phases There will be problems associated with markedly ex tended time of flight new navigation methods train on present

communication techniques, entry into unknown atmospheres and radiation belts, and the fact that some requisite knowledge as the precise composition of planetary masses is still unknown Venus and Mars, the most intriguing planets as well as the closest to earth, with Venus only 6 minutes away measured in speed of light time or 26 million miles and Mars 12½ minutes away or 35 million miles, will undoubtedly merit attention first Here consideration must be given to flight time which will con

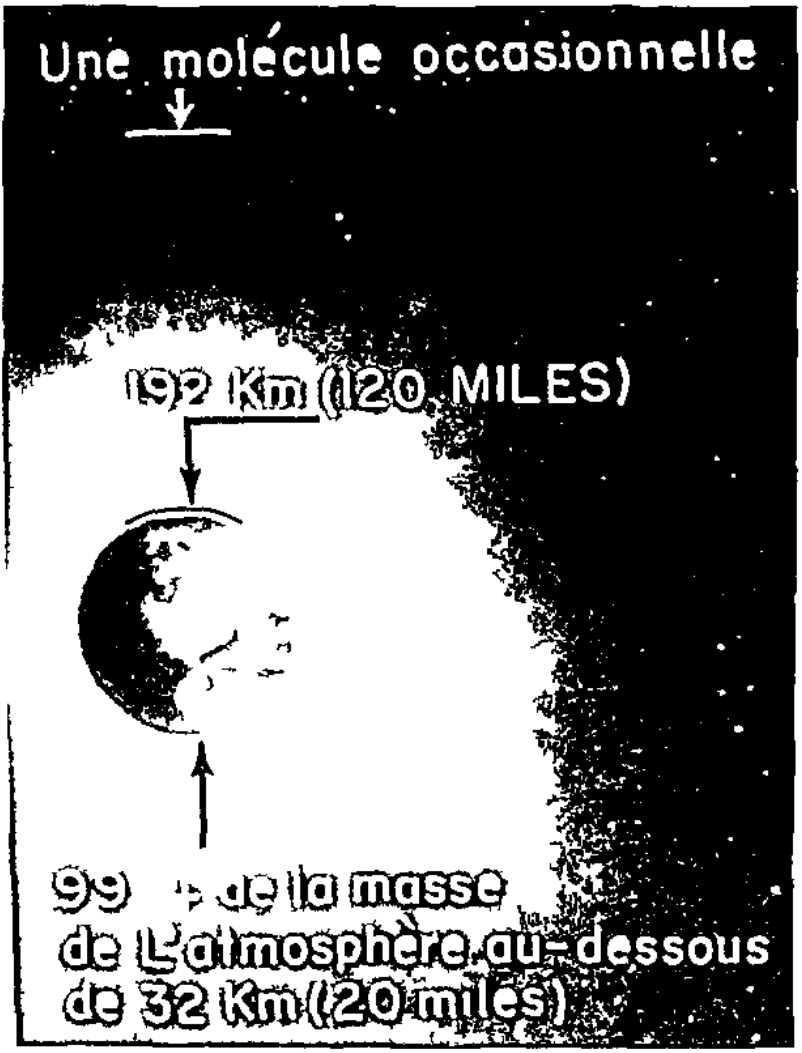


Fig 4 Diagrammatic representation of distribution of earth atmospheric mass (From P A Campbell[6])

sume years rather than days under hoped for conditions of travel Because of the cloud cover of Venus, nothing concerning its surface is known Venus will be a surprise planet when visited by the pioneer astronauts [1] Much more is known about Mars Conditions on its surface are very similar, with regard to temperature and pressure to stratospheric conditions eleven miles above the earth s surface [14]

As techniques improve and the many problems of vehicular propulsion guidance and internal environment for longer voyages are conquered the further exploration of our solar system can become a reality Future scientific exploration will be impossible however without the continued contributions of aviation medicine or flight medicine as it should now properly be called The eventual benefits to mankind from the research endeavors in the basic medical problems associated with space flight are unlimited Many notable dividends to medical progress have been made through past activities of aviation medicine Contributions have been made in oxygen and carbon dioxide studies pressure



F gur 5 M t ag 14 d y Phot g ph d th 8 h P l m t l p

breathing dysbarism cardiovascular and respiratory dynamics and body temperature response In public health advances have been made in the practical field of bringing rapid succor through airlift to stricken communities in the air transport of critically ill patients and in the development of protective measures for crash deceleration In addition progress in preventive medicine has been made in the control of disease factors precipitated by global air transportation

Untold possibilities for increased knowledge are in store for the future in the exploration of new environments new worlds and a radical change of earthbound perspective Man must be

studied in this new situation by a careful analysis of his systemic capabilities and limitations Research must be directed to the biochemical and biophysical reactions of the central nervous system to problems of the special sensorium and impulse transmission, and to musculoskeletal respiratory, cardiovascular, gastrointestinal, genitourinary, humeral and glandular activities We can hope that the phenomenal discoveries awaiting us in all scientific fields, as man's endless exploratory quest continues,



Figure 6 Region of Clavius of the moon Photographed with 200-inch Hale telescope

will also aid in solving many of the baffling medical problems now facing us here on earth

A view of our small planet following its orderly course in the infinite universe containing billions of more suns larger than ours each with its own planetary system, cannot fail to make one appreciate the universal brotherhood that unites earthly humans into one family With such an outlook, international goals

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Figure 5 Moon taken during 14 day Photographed through 8 inch Palomar telescope

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PSYCHOLOGIC ASPECTS OF THE "NAUTILUS" TRANSPOLAR CRUISE

JACK L. KINSEY *Captain MC USN*

THE recent transpolar cruise of the USS *Nautilus* (SSN 571) provided a unique opportunity to observe and evaluate the interpersonal relationships of a rather isolated group faced with hazards of unknown degree while performing a historic mission. It was my privilege to be on board the *Nautilus* during both phases of Operation Sunshine, for the purpose of uncovering and defining potential problems relating to the Polaris weapons system in which the fleet ballistic missile submarine will be the launching platform for a solid propellant intermediate range ballistic missile (IRBM). The two basic areas of interest can be roughly divided into environmental and psychologic. This article will be concerned only with the psychologic aspects of the operation except where the environmental factors were intimately related to the psychologic.

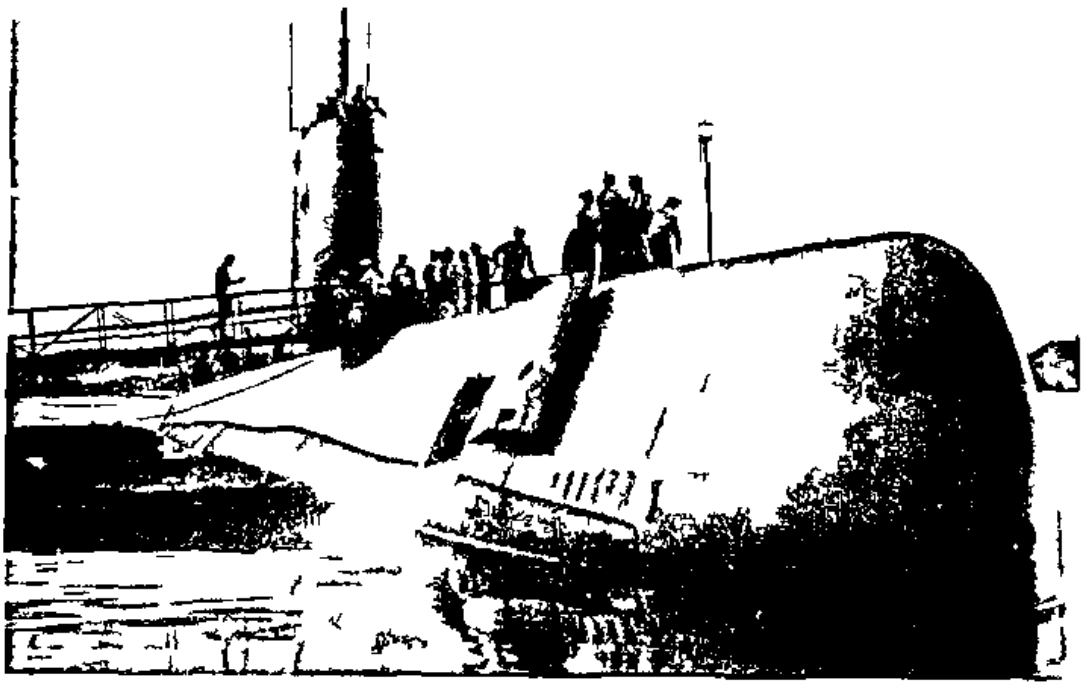
Operation Sunshine was conducted in two phases. The first of these began 8 June 1958 upon departure from Seattle, Washington. This phase consisted of a high speed run to the Aleutian chain, transit of the Bering Sea east of St. Lawrence Island after a westward passage was halted by heavy ice in relatively shallow water, and an uneventful transit of the Bering Strait to the Chukchi Sea. After penetrating northward to 69° on meridian 167° W. the probing mission of this phase was terminated. It was decided that a return to Pearl Harbor to await more favorable conditions for an Arctic transit was the prudent course. On 12 June, the *Nautilus* steamed south toward Pearl Harbor, arriving there on 28 June.

The second phase of the operation began 22 July 1958 upon departure from Pearl Harbor (figs. 1 and 2) for another high speed run to the Aleutian Islands. This time an ice-free passage west of St. Lawrence Island was successful. Again the Bering Strait was left behind as the *Nautilus* steamed north in the Chukchi Sea. On about the same track as phase 1, the *Nautilus* was able to penetrate almost to latitude 73° N. before being forced by heavy

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From Special Projects Office, Bureau of Ordnance, Department of the Navy, Washington, D.C.

ice formations and relatively shallow water to seek another pas sage to the deep water of the Arctic Basin This was found by running eastward to a location just off Point Barrow, Alaska, where a sea canyon begins relatively close to the Alaskan coast and rapidly deepens to several hundred fathoms This point was reached early on 1 August The *Nautilus* dove and began the under ice portion of the cruise that took us under the North Pole on 3 August and found us in the open water of the Greenland Sea on 5 August 1958 The remainder of the cruise was routine



F g l C w m mb f th U S S N t l p p t g t und w y f m P a l Ha bor T H f th t p d th p la

A combination of several stress producing factors were en countered during this operation (1) an extended period away from home and families (2) the isolation of prolonged submerged runs (3) hazardous conditions such as 96 hours under the polar ice cap and (4) participation in a historic event the first transit of the Arctic Ocean from Pacific to Atlantic via the geographic North Pole In other words the personnel on board were observed during the anticipation of adventure and trail blazing the frus trating aspects of delays due to heavy ice and relatively shallow water and the satisfaction of success and a job well done In the face of this series of emotion provoking situations there were no major psychologic problems As a matter of fact there were no minor problems of a psychologic nature if by the term problem a need for medical or psychiatric therapy is implied This is consistent with previous reports of neuropsychiatric casualties on submarines During World War II only 56 cases were reported from 1 500 war patrols that included approximately

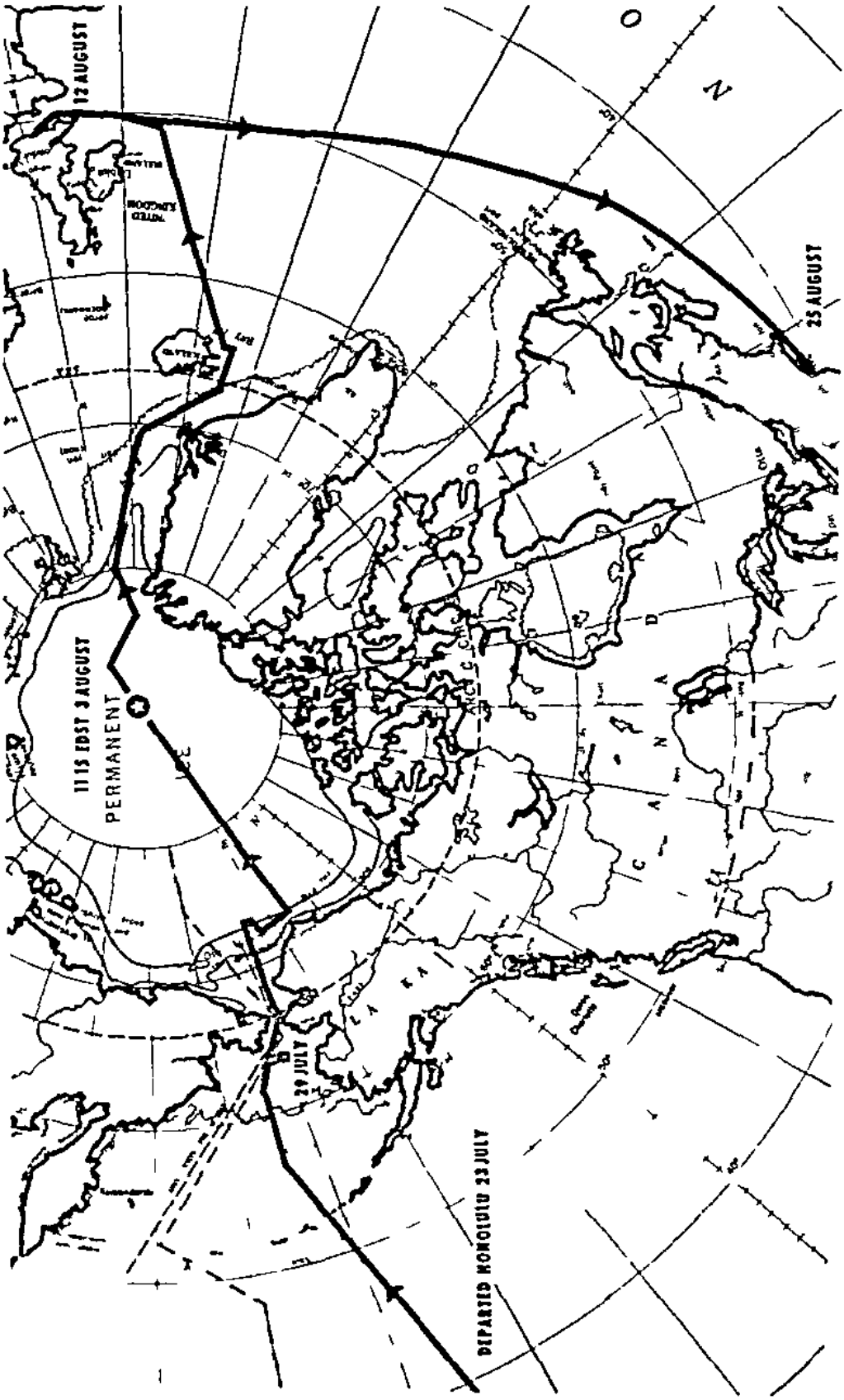


Figure 2 Route taken by the Nautilus on h t anspolar trip that bepan 23 July 1958 and te minated at New York 25 August 1958

1^90 000 man exposures This article therefore will discuss factors that influenced morale and motivation

A few of the many factors that aided in maintaining high morale will be listed and commented upon Four major items that are so obvious they are often overlooked are (1) a ship that perform ance wise has met or exceeded every demand (2) a technically sl illed crew (3) exceptionally competent officers professionally and (4) outstanding leadership All of these were effectively integrated so that the over all level of morale was greater than could be expected from pure addition of the single factors

MAINTAINING IIGH MORALE AND MOTIVATION

Environmental Devices Contributing a great deal to morale was the *Nautilus* herself Past performance including the Arctic under ice experience in 1957 had won the confidence of all hands in the reliability of the power plant This confidence was well placed as never once was there a su_gestion of failure in the mechanical plant The various types of sonar equipment designed to determine depth under the keel depth below the surface thick ness of ice above and presence of ice ahead added to the feel in_ of security Advanced navigational equipment was an important factor in maintainin_ confidence and morale

The closed circuit television with the topside camera was more than a device to entertain personnel with observations of open leads and thin ice in the ice pack overhead It provided accurate visual observations that could be plotted for use later in the event an emergency surfacing was necessary Also durin_ an emergency surfacin_ it could be used to rapidly scan the open area of the sea and the surrounding ice to minimize the danger of topside damage to the submarine during the operation

Durin_ the entire cruise atmospheric conditions were main tained at levels consistent with health and comfort For example the oxygen concentration averaged 20 per cent and the carbon dioxide level was below 1 5 per cent Temperature and relative humidity were close to ideal with the former varying from 4 to 16 F and the latter from 40 to 50 per cent

The installation of an emergency air breathing system (fig 3) with masks and quick disconnect hoses capable of being attached to air manifolds at all duty stations as well a in the ward room and crew s mess added to everyone s confidence that even a fire or radiation ca ualty under the ice would not require immedi ate surfacing for ventilation Pure air from the air banks would be available for a considerable period givin_ time to search for a suitable place to surface

In addition to the e basic engineering contributions to esprit de corps there are other installations that although not directly essential to the operation of the ship nevertheless are important

indirectly as they keep the crew pleased and happy For example, the availability of a washing machine offset the somewhat limited locker space on board and still enabled the men to have regular changes of clean clothing The fresh water making capacity was sufficient to permit frequent bathing by all hands, a privilege unheard of on a conventional type submarine These items are pointed up by one incident that occurred An experiment was set up by the Medical Research Laboratory, New London, Connecticut and conducted by the ship s medical officer to determine the effectiveness of a new chemical in keeping treated undershirts *odorless* The experimental design required the subjects to go two periods of four days each without a shower There were mild objections and considerable joking about the fact that this was unnecessary on the *Nautilus* and, indeed, except under unusual circumstances, it was unnecessary



Figure 3 Engineman demonstrate the emergency breathing system as the U S S Nautilus begins her transpolar voyage

Food was plentiful, of excellent quality and exceptionally well prepared An outstanding item was the fresh baked breads served every morning In spite of the copious quantities of good food no unusual weight gains were noted among the personnel

Music was furnished through a jukebox with 100 selections available from three selector stations, one each in the wardroom, chief petty officer s lounge and the crew s mess There also was a high fidelity tape reproducer with a large variety of taped recordings that could be played over the same system as the

jukebox or listened to with earphones There were sufficient speaker outlets throughout the ship so that music was available in most areas The popularity of this facility is attested by the fact that it was a rare occasion indeed when music could not be heard over the system One such occasion was the minute of silence requested by the commanding officer at the moment of crossing the North Pole

Music was utilized not only for the primary listening pleasure derived from hearing favorite selections but also as an agreeable background for meals card playing letter writing or reading It must be noted that there was never complete agreement on the type of music to be played With selectors available to all the procedure was entirely democratic and no selector had precedence over any other Indeed it appeared that any music was preferable to no music The almost continuous use of this type of auditory stimulation may have had its source in the reduced sensory stimulation of the submarine s confined environment

The choice of records and tapes varied from rock and roll to the classics with a generous selection of ballads Dixieland jazz waltzes and standard numbers There also were some novelty numbers which seemed to arouse stronger likes and dislikes than any other types The meaning of this latter observation is not clear but suggests that an expertly planned program might even be more effective than the present method

Reading was also a favorite pastime of most every one on board The choice of reading material was wide and varied from serious nonfiction to frivolous fiction cartoons and photographs in the playboy type magazine The serious reading material included technical books and publications necessary to advancement in rate and qualification aboard a nuclear powered submarine During the cruise there was a concerted effort to stimulate as many unqualified crewmen as possible to complete their qualifications The success of this drive was furthered by the fact that a special qualification ceremony was to be held at the North Pole Its success was evident as 11 men appeared to be congratulated by the captain on having completed their qualifications for nuclear submarines

Interpersonal Devices The discussion of the psychologic aspects of the voyage should include consideration of the various ways in which morale and motivation were maintained at a high level as well as some of the methods utilized to reduce anxiety and tension This is not to imply that abnormal anxiety was present or observed but to indicate that the usual tensions resulting from daily routine personal interrelationships and responsibilities related to the over all situation were met and adequately dealt with by various means These included anything from planned programs such as the movie schedule and card tournaments

to the less organized and sometimes more subtle devices such as arguments, physical horseplay and joking Professional competence, technical skills, and the important but difficult to-define factor, leadership, also played eminent roles in this respect It should be pointed out again that there was no apparent awareness of anxiety or the need for its reduction

Any means used to maintain high morale, keep the individual busy, interested or entertained can be considered an anxiety or tension reducing agent Among the many ways for accomplishing this during the cruise were tournaments of various types of games such as cribbage, acey deucey, pinochle, checkers and chess These games were also played frequently both before and after the tournaments were completed The tournaments served several purposes in that they organized the competition, produced a champion and added a small cash reward from the entry fees In addition to the competitive efforts inspired by the tournaments were the contests run to determine the design of a distinctive flag to fly entering harbor, and an appropriate name to assign to the individuals transiting the Arctic via the North Pole The incentive in each case was a 72 hour liberty in England Both contests provided opportunity for thought, discussion and, in the case of the flag contest creative effort The interest and activity generated by these contests was definitely beneficial in maintaining a high level of morale It is believed that personal or "local" goals are an important supplement to the major goals of a mission In fact, local goals may increase in importance in maintaining morale as the more glamorous and romantic goals are gradually replaced by routine operations The value to the individual of being the cribbage tournament champion, of creating a prize bit of handicraft or completing a college course for credit could conceivably be relatively greater and his feelings of personal achievement more satisfying than the achievement of a nonglamorous major goal for the fifth or sixth time Personal goals will then become necessary to fill up time, utilize available energy and to give meaning to the daily life of the group

Movies (fig 4) provided an important recreational feature during the operation At first sight it might seem that movies represent an environmental factor in the maintenance of morale While this is true, movies also make an equally significant contribution to morale by acting as a medium for emotional release For this reason they are discussed in this section The crew's messing compartment can be rapidly converted from a dining space seating 36 to a movie theater seating 50 people This is done by tilting three of the table tops to the vertical position and rigging the extra benches concealed beneath The sound movie projector is contained in a recess in the after bulkhead and is merely swung into place, plugged in, the reel placed in position and film threaded The screen is lowered from overhead and the movie theater is ready

The importance of movies as the principal organized entertainment on board and as the prime contribution to good morale makes their proper selection a matter of considerable concern Type and quality are the main items to be considered in making a selection From a series of casual inquiries among the crew it appeared that type preferences can be rated roughly in the following order (1) good westerns (2) mystery and good science fiction (3) comedy classical drama and musicals grouped at approximately the same level of preference It should be noted that a pretty girl particularly if scantily clad will be most favorably received and provoke a favorable response to any type of picture Color pictures are preferred but black and white films are acceptable provided that other desirable aspects of type and quality are apparent



F gur 4 C w m mb tt d g of th tw d ly m h u g th N l pa und th ar t

It might seem at first blush that top grade pictures should unqualifiedly be chosen for long cruises but this is not necessarily desirable The selection of a few poor quality pictures is advisable The purpose of this is not so much to show the contrast between good and bad pictures but to mobilize activate and release anxiety particularly that occuring from a more or less repressed feeling of hostility This hostility is a normal reaction similar to and related to the normal anxiety developed in everyday interaction among groups An example of this relea e mechanism in action follows

The first fe / poor pictures in a sequence of poor pictures produced man sarcastic comments and much infectious laughter The evidence that this provides a tension reducing effect is trengthened by the ob ervation that after several poor pictures

were shown in sequence, the tension was reduced to where there was little or no comment or laughter, i obvious opportunities In other words, the effectiven poor picture in reducing tension was rather short entertainment value the diversion from immediate and the pleasures of identification with the actors in go was beneficial over a much longer period

In the isolation and confined environment of a su a prolonged submerged operation, many common r for reducing anxiety are utilized routinely but to a lar subconsciously For example, if one uses the Freudi of the use of humor as an outlet for hostility and as for tension, then some of the behavioral interactions submarine personnel can be identified readily It is n pose of this report to delve deeply into the dynamics humor It should be noted that humor does have a function other than providing "fun," was utilized in se during the cruise and for the most part was well withi of social acceptability

It was observed during the cruise that apparently and more or less permanently established jokers c were present among officers and chief petty offic as among the enlisted men This does not imply tha ations were necessarily confined to their own gro this was more commonly so Their "appointment" wa based upon one or more factors These were nati the field of wit and humor, their own emotional nee sulting from experience and practice of the art, and to some extent subconsciously of the emotional nee in the group for their services

The methodology varied from person to person a to time even when perpetrated by the same individual certain effects however that apparently remain First the humorist was assured of being the center for the duration of his act Many times this was e in that this implies domination of the group if onl time similar to the court jester of old Secondly, h by the group s laughter This amounts to group appr from tension release during laughter and from whi may gain an additional dividend of pleasure by j general outburst If a victim or scapegoat is in often the case further pleasure may be derived by t and the humorist from the victim s discomfort

The variations in dispensing humor are too numerous individually but a brief presentation of the more co

the group and thus gain approval for the dispenser This was done in most cases by using a current subject or situation for a base line and then by a clever play on words such as by punning providing a double meaning or by the more obvious means of injecting the off color theme This apparently is done hopefully to evoke a quick response of laughter Once the pleasurable effect of the anxiety reduction from the first hearty laughter is experienced by the group it is relatively simple to proceed by elaboration of the theme or by substitution of a related one to expand the situation until all of those present are satiated The entire procedure usually includes other contributors getting into the act to supplement the merriment

Not all of the laughter provoking methods can be considered truly funny some are obviously aggressive in nature and some may be of relatively serious intent initially at least Arguments of various kinds are an example of the latter Arguments may begin over an honest difference of opinion and then deteriorate as others enter the picture and supply a touch of ridicule or humor to the situation In some cases the situation resulting in an argument has been carefully set up by others with entertainment of the group in mind This implies the selection of a victim or victims that is an interesting procedure involving interpersonal relationships There are several ways by which an individual can be picked for this role For example, the victim may subconsciously although apparently deliberately select himself by remarks or behavior that demands the attention of the group and the specific response of the joker in the group In other instances the jester may select a likely individual and either make a sharp aggressive frontal attack with everyone present aware of the entire procedure or by sly innuendoes provoke a response with the audience more or less unaware of the identity of the victim until he responds to the baiting Still another method is for the jester to make opening remarks in an apparently casual manner with no specific victim in mind and wait until some one takes the bait or accepts the challenge The various methods parallel in many respects the behavioral patterns observed in a *family group The more experienced and higher ranked or rated* individuals represent authoritarian figures and the others display sibling type rivalry in an effort to maintain or improve their status Similar also to many family interrelationships are the strong emotional bonds that in spite of arguments practical jokes and verbal needling keep the group functioning as a well integrated team and preclude deterioration of interdependent feelings for one another

Another humorous aggressive device successfully utilized was the newspaper or so called scandal sheet As there were extremely few opportunities to copy newspaper columns the news items as the name of the paper indicates were based upon re-

marks, rumors, behavior, and reports regarding the personnel aboard Among the articles printed were real or fancied events occurring on liberty, chance remarks overheard by others, the humorous side of serious situations occurring on board, and fictitious material that ranged from the gently chiding to gross slander The paper like other forms of humor, in spite of its aggressive nature, was eagerly awaited, well accepted, and produced laughs each morning it appeared The victim, if any, usually joined in the laughter It is interesting to note that the officers were the principal target of comments with the chief petty officers a close second

SUMMARY AND CONCLUSIONS

Some of the psychologic aspects of the *Nautilus* transpolar cruise have been reported and discussed It seems apparent that favorable environmental factors contribute greatly to the maintenance of high morale and strong motivation These factors include not only those vital to safety and existence under unusual conditions but, for morale purposes possibly of equal importance, those unnecessary but highly desirable facilities that make life on a submarine more pleasant and comfortable There is much evidence to show that a major increment of morale is provided by the obvious interest of higher echelons in the men s welfare by the very fact that these pleasant and comfortable additions to submarine life are provided It is believed that many of these items could be more effective in promoting high morale if expert consultation were sought and utilized

The need for and benefits to be derived from meaningful goals, both major and "local" or personal goals, has been pointed out with the hope that this knowledge will be helpful both in training for and performing future extended operational missions of various types

In the body of this report it was noted that the group interaction paralleled, in many respects, an interrelationship observed in many families This analogy does not imply that this is the only way a submarine crew can work out their problems of group adjustment There are many ways *Skate s* use of an educational program as the principal means to maintain interest and high morale and to demonstrate leadership is another The point to be emphasized is that in any group, family or submarine crew, interpersonal relationships must take place with a favorable end result in order to ensure a smoothly operating, co-operative, and successful team It must also be noted that this is *not* a static affair, even when a satisfactory adjustment has been achieved, but a dynamic procedure with continual *interplay* of psychologic and environmental forces The most important implication, therefore, is that, no matter *what* group interaction is under way, cool, levelheaded leadership of an emotionally

mature commanding officer must be available to maintain a neutral and supportive balance

It must be remembered that leadership is also a dynamic complex interrelationship between the leader and his people This leadership depends not only upon the personality of the leader but upon the varying reactions of the group and the physical environment It is fortunate that the selection and promotion system of the Navy has built in factors that tend to assure good leadership It is also fortunate that the assessment selection and training programs for submarine service have been equally effective as has been commendably demonstrated by the achievement of the officers and men of the *Nautilus* The successful experience of the past offers a firm point of departure for development of mechanisms for coping with any new parameters future operations may introduce

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THE HAZARDS OF WEIGHT LIFTING

A review of the literature makes it apparent that lesions caused by weight lifting rarely appear on the limbs but are not uncommon in the trunk We all know that hernias and prolapses can be precipitated by weight lifting and anyone who does a bit of spare time gardening can testify that repeatedly lifting a weed and clay laden spade can cause lesions of the soft tissues of the back even though an exact diagnosis cannot always be achieved in such cases Our orthopedic and neurosurgical colleagues spend much of their time dealing with patients who have lesions of their intervertebral disks disorder in which acute symptoms often first appear when the patient tries to lift some large and heavy article There thus appear to be two basic types of injury to the trunk There is an anterior *extrusive* group of injuries which includes visceral hernias and prolapses and a dorsal *spinal* group including such lesions as lumbosacral strain prolapsed intervertebral disks at the lumbar and cervical levels tear of posterior ligaments and paraspinal muscles and the less frequent crush fractures of the bodies of the lower thoracic and upper lumbar vertebrae —Peter R Davis Posture of the Trunk During the Lifting of Weights *British Medical Journal* January 10 1959

EVALUATION OF DIURIL IN 50 PATIENTS WITH TOXEMIAS OF PREGNANCY

H L RIVA *Colonel MC USA*
JAMES D HEFNER *Captain MC USA*
KENNETH N OWENS, *Major MC USA*

THERE is ample evidence that patients with toxemia of pregnancy have an abnormal water and electrolytes balance Dieckmann and associates[1] demonstrated that the elimination of sodium and water is delayed in all pregnant patients and is further delayed in patients with toxemia of pregnancy Important therapeutic measures in the treatment of edema and toxemia of pregnancy include rest, reduction of excessive blood pressure, appropriate dietary control, and administration of an efficient diuretic

In the past, ammonium chloride and Diamox (brand of acetazolamide) have been used on the obstetric service of this hospital as the diuretics of choice In November 1957 a study was undertaken to determine the effectiveness of a new diuretic compound Diuril (brand of chlorothiazide) The results in 50 patients receiving this diuretic are presented in this report

Previously 147 patients with mild or moderate preeclampsia with fluid retention and clinical edema were studied to compare the diuretic effectiveness of Diamox with that of ammonium chloride and of bed rest alone [2] Statistics on these patients are included for the purpose of comparing Diuril with the previously used diuretics The diagnosis was based on the criteria set forth by the Committee on Maternal Welfare [3] The diagnostic determination procedures and therapeutic regimen prescribed for patients in the previous study[2] were followed for the present group

All patients included in these series were admitted to the hospital All patients who were delivered during this study were excluded A total of 197 patients were completely evaluated Of these 45 were treated with bed rest alone 42 received ammonium chloride 60 received 250 mg of Diamox daily [2] 50 received Diuril Initially, the patients receiving

From Walter Reed Army Hospital Washington D C

Diuril were given 250 mg daily but this proved to be inadequate After dosage was increased to 500 mg daily effective diuresis was obtained

RESULTS

The results of the studies are shown in tables 1, 2 and 3

The age gravidity, parity pre-pregnant weight the gestational week that edema was noted and the admission weight were comparable for all four groups of patients

TABLE 1 *Comparison of average weight changes in 197 patients with pregnancy*

Data	Multiple Data			
	Diamox (60 patients)	NH_4Cl (42 patients)	Bed (45 patients)	Diuril (50 patients)
Age	26 63	26 98	26 80	24 36
Gravidity	2 03	2 17	1 87	2.24
Parity	0 89	0 16	0 80	0 98
Pre-pregnant weight	140 80	137 90	145 00	140 50
Week edema noted	34 50	36 10	34 40	33 60
Weight admission	167 70	164 10	171 50	166.90
Total weight gain	26 90	26 20	26 50	24 30
Weight loss first 5 days of therapy	9 60	7 80	7 20	9 10

This modification of table 1 of 2

After five days of therapy the average weight loss for patients treated with bed rest alone was 7 2 pounds with ammonium chloride, 7 8 pounds with Diamox 9 6 pounds and with Diuril 9 1 pounds The minimal weight loss after five days of Diuril therapy was 3 pounds and the maximum weight loss in five days was 16 5 pounds Of the 60 patients treated with Diamox several had paresthesias and several had blurring of vision thought to be caused by ciliary spasm These symptoms were transitory There was one case of hematuria thought to be the result of the sulfonamide like structure of Diamox inasmuch as the patient was known to be sensitive to sulfonamide and had had a similar toxic manifestation There were no untoward side effects noted in the 50 patients treated with Diuril

Of the 50 patients treated with Diuril, 20 had elevated blood pressure The average mean arterial pressure was 116 mm Hg Following Diuril therapy there was a reduction of the mean arterial pressure to 88 mm Hg or an average reduction of 25 per cent Table 3 illustrates the blood chemistry determina

tions in patients receiving Diuril The admission and discharge determinations reflect so little change that it is not thought to be clinically significant It must be pointed out

TABLE 2. *Comparison of average blood chemistry studies in 147 patients with pre-eclampsia of pregnancy*

Constituent	On admission			At discharge		
	Bed rest	NH_4Cl	Diamox	Bed rest	NH_4Cl	Diamox
Blood urea nitrogen (mg/100 ml)	9 3	9 1	9 2	11.1	12.0	11 3
Carbon dioxide (mEq/liter)	20 9	21.1	20 1	21.7	22.0	21 8
A/G ratio	2.8/3 2	2.7/3 1	2.5/3 2	3 0/3 7	3 1/3 4	3 2/3 6
Uric acid (mg/100 ml)	4 7	4 3	4 1	5 2	5 4	5 1
Chloride (mEq/liter)	108	111	115	102	101	100
Sodium (mEq/liter)	135	131	138	130	127	132
Potassium (mEq/liter)	4 1	4 0	4 2	4 0	3 9	4 1
Total protein (grams/100 ml)	6 0	5 9	6 1	7 4	7 5	7 2
Average electrolyte excreted in urine (mEq/24 hours)						
Sodium	90 6	93 5	95 1			
Potassium	41 8	44.3	49 2			
Chloride	140 6	145 4	149 1			

however that this diuretic was given for only a short time, and the minimal changes in the blood chemistry determinations may not be present if this drug is given over a longer period

DISCUSSION

Diuril is known chemically as 6 chloro-7 sulfamyl 1, 2, 4 benzothiadiazine-1, 1 dioxide and is designated by the generic name of chlorothiazide The drug enhances the excretion of sodium and chloride by the renal tubules [4] The mode of action of Diuril in influencing the excretion of sodium and chloride has not been fully defined Studies in laboratory animals have shown that Diuril is uniformly and well absorbed following its oral administration and is rapidly eliminated by the kidneys At effective doses, the compound does not alter significantly glomerular filtration rate or renal plasma flow [5]

Since the figures obtained reveal marked comparability with the exception of total weight loss it appears that there is little advantage in adding ammonium chloride to a regimen

TABLE 3 *Blood b ry ud 50 pa b pat p l mp of pr g ancy d b D ural*

C tu	O d			A d harg		
	um	l m	A er g	um	M	A
Bl oc ur (g/100 ml)	15	3 0	9 5	25	5 0	14 2
Carb d d (Eq/l)	25 2	18 5	21 8	76 9	17 7	22 9
A/G			8/3 3			3 1/3 5
Lr d (mg/100 l)	8 2	3 0	5 0	10 8	4 2	6 5
Chlor d (Eq/l)	136	96	105	103	90	100
Sod (mFq/l)	147	103	135	143	130	135
P m (mEq/l)	5 3	3 4	4 2	5 0	3 1	4 0
Tot l p ot (g /100 l)	6 7	5 4	6 1	8 2	6 3	7 6

A l lyt d urin (mEq/24 hour)			
Sod m	241 5	13 0	96 9
Pot um	1 2 4	9 6	50 4
Chlor d	235 0	74 0	152

consisting of bed rest alone because the total weight reduction is almost identical The total weight loss in the patients given either Diuril or Diamox is also comparable and is significantly increased over those patients given ammonium chloride or only bed rest While the patients receiving Diamox lost slightly more weight than those treated with Diuril (table 1) the difference is so slight that it is not clinically significant This slight difference certainly is offset by the obviously lower incidence of toxic manifestations of Diuril

SUMMARY

The effectiveness of Diuril in producing diuresis in patients having preeclampsia with edema was compared to that of Diamox ammonium chloride and of bed rest alone Bed rest proved to be effective and the addition of ammonium chloride did not significantly alter the effectiveness Diamox and

Diuril were both approximately 20 per cent more effective than either bed rest or ammonium chloride

No significant difference in blood chemistry determinations was found

There was little difference in the effectiveness of Diuril and Diamox in producing diuresis Because of the lowered incidence of toxic manifestations encountered with Diuril therapy, it appears that this new diuretic is a valuable adjunct to current methods used in treating preeclamptic patients

REFERENCES

1 D ckma n W J Seski A. G McCartney C. P Smitter R. C. Poming r R. E Brunetti R. Rynkiewicz L. M. Allen J and R gester R Etiology of ecl mps a w t r balanc *Am. J Obst & Gynec* 58 1014-1031 Nov 1949

2 R va L Pi kh tdt W L. and Becker M. M. Diamo in pre clam ia U S *Armed Force M. J* 7 1777 1780 Dec 1956

3 D ckm nn W J *The Toxemias of Pr gnancy* 2d ed tion C. V M sby Company St Loui Mo 1952

4 Beyer K H. Baer J E. R s H F nd H mb ch A. Chl rothiazide (6-chloro-7 sulf myl 1 2 4-benzothi d az ne-1 1-d xid): Enhancement of sod m chlo de excr tion *Fed. Proc* 16 282 Mar 1957

5 Rus o H F Ba r J E Noll R. M and B yer K. H. F alu ti n of chloro-th a ide s luret c-d ur t c ag t in dog *Fed Proc* 16 333 M 1957

RESEARCH IN SUBMARINE MEDICINE

In the realm of physiology the results of submarine medical research are of considerable value to all practicing physicians When the etiology of nitrogen narcosis is finally disclosed many of the formidable questions of closed technic gas anesthesia will be solved Air embolism has become a recurrent tragedy in cardiac and thoracic surgery Definitive findings in this area of investigation are almost within our grasp and with these answers will surely come some new and useful concepts of human respiratory physiology The appreciation of pure oxygen as a powerful neurotoxin was derived from early investigation of gases under high partial pressures but even today this entity is not given proper credence by medical practitioners Human response and adaptation to carbon dioxide is of major importance in underwater medicine The problem is equally critical to the internist the anesthesiologist and the general practitioner

—Bartholomew W Hogan The Practice of Submarine Medicine *Medical Arts and Sciences* Second Quarter 19,



Clinicopathologic Conference

Tokyo Army Hospital

NUMBNESS AND PARALYSIS

Summary of Clinical History A 43 year old Australian Army sergeant was admitted to this hospital on 16 November 1957 with complaints of numbness of the hands and feet inability to move and difficulty in swallowing and talking He was transferred from the 121st Evacuation Hospital Korea, on the seriously ill list

First Hospitalization The patient was seen in a dispensary of the Australian Armed Forces initially on 12 November with a history of feeling off color for two weeks one week of evening chills numbness of the hands and feet and on the 12th of November he complained of numbness and a woody feeling about the tongue and mouth At that time physical examination revealed a normal neurologic status

The patient was transferred to a medical facility in Inchon Korea He had discontinued Paludrine (a British proprietary antimalarial drug) 15 days prior to this admission A blood smear for malarial parasites was found positive for ring form trophozoites Also at this time vertigo was added to the complaints Routine antimalaria therapy was started The patient s temperature which was 101 F at the time of admission fell to 96 F and the patient felt weak and exhausted He complained of glovelike woolly sensations in both hands present on movement of both his arms His feet felt wooden and he was unable to walk He felt dizzy on standing An examiner reported loss of position sense although the patient was able to assess a

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toe pointing test properly No definite loss of pain or touch was reported Vibration sense was equivocal Deep tendon reflexes were sluggish and difficult to elicit Plantar response was nil Slight weakness was suggested in the right leg The pupils were equal and reacted, with consensual reflexes present The optic disks were normal

In view of the neurologic symptoms, the patient was transferred to the 121st Evacuation Hospital Urinalysis was negative The white blood cell count was 8,200 per μl, with 66 per cent neutrophils and 31 per cent lymphocytes Sedimentation rate was 16 mm per hr and hemoglobin was 88 grams per 100 ml On arrival at that hospital, the history was as previously noted, and on physical examination he was found to be a well developed, well nourished man, mentally clear and oriented, but appearing ill The head and neck were normal No facial paralysis was noted (A "droop" noted on the right side of the mouth was considered congenital) There was no nuchal rigidity The lungs were clear The heart was not enlarged Blood pressure was 140/108 mm Hg Knee jerks were bilaterally sluggish Babinski, Brudzinski, and Oppenheim reflexes were negative There was definite weakness of the right arm, particularly of the deltoid muscles, and there was numbness of the wrists hands, and feet but no objective sensory changes were noted The eye consultant reported the external appearance of the eyes to be normal the *pupils round and reactive to light and accommodation The optic* disks were well outlined retinal vessels were normal, and no exudates or hemorrhages were seen Ocular tensions were normal

On 14 November the patient s blood pressure was 174/130 mm Hg His general condition remained the same with numbness a prominent complaint It was thought he might have hypertensive encephalopathy He vomited on occasion Following Thorazine (brand of chlorpromazine hydrochloride) the patient felt better He exhibited progressive difficulty moving about in bed, coughed often and frequently seemed to be choking He became unable to feed himself and was then transferred from the 121st Evacuation Hospital to this hospital on 16 November

SECOND HOSPITALIZATION

Physical Examination At the time of arrival here the patient was a litter case His blood pressure was 148/100 mm Hg respirations, 26 per minute, and his temperature was 99°F rectally His pulse was regular He appeared florid faced but not cyanotic No abnormalities were noted about the head or neck, and the neck showed no rigidity Except for occasional rhonchi, the left side of the chest was clear but auscultation of the right side revealed some dullness and decreased breath sounds at the base but no rales were heard Examination of the



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(brand of quinacrine hydrochloride) quinine or pamaquine naphthoate Review of pharmacology textbooks concerning the major observed toxicities of these drugs would not implicate them in a ca e such as *ours although this cannot be ruled out Chloroguanide hydrochloride* is the mo t innocuous of the curr ntly used antimalari l the chief toxic effects being on the gastr ntestinal system and then only in large dose Chloroquine phosph te may cause a variety of symptoms but ev n after prolonged administration in large doses the side effects usually are mild nd reversible Pr maquine phosph te may cause abdom nal cr mps mild anemia cyanosis due to methemoglobinemia leukocytosi and intravascular hemolysis especially in Negroes though the usual dosage of 15 mg (base) per d y for 14 days is rel atively safe Both atabrine and quinine m y be toxic to the skin gastrointestinal t act and central nervous sy tem but of the nervous *system toxicity i more likely to b th t of excitat on convulsions* and tox c psychoses rath r than flaccid paralysis Pamaquine s most serious toxic effects are on the blood but the gastrointestinal tract and the centr l nervous systems al o may be severely affect d

Co sider ng other i fections we would con ider poliomyelitis but rather quickly xclude it b cause of the followmg fe tures of this case (1) absence of mu cle pain or tenderness (2) absence of igns *of meningeal irritation (3) progr s ion of par lysis at a stage when* th r was no fever and no cells in th pinal fluid and (4) presence of sensory disturbance

Japanese B encephalitis exists in Korea and is of protean mani festat ons Of inter st s the fact that there frequently is a leukocytosi with an increase in neutrophils (contr ry to what one expects in a virus d ea e) Early in th s man s illness h s white blood cell count was normal *Although one would expect to find up to about 250 blood* cells (usually lymphocytes) in the cerebrospin l fluid there h ve been instances in which no cells were found so the ce ebrospin l flu d finding w uld fit Against such a di gnosis are the following (1) abse ce of cerebral symptoms such as mental confus n dis orientation and halluc nations (2) absence of sp sticity convuls ons or tremors (3) absence of stiff neck In fact the absence of signs of men ngeal irritation and the absence of at lea t a few blood cells in the spin l flu d excludes the diagnosis of aseptic meningit s which may be caused by any one of many viruses—such as poliomyelitis mumps herpes lymphocyt c choriomeningitis virus lymphogranuloma *venereum Cox ackie virus et cetera or pirochetes such as lepto* spira or even *T p n ma pallidum.* Any of th se agent could con ceivably be responsible for the Guillain Barre syndrome an atypical vari nt from the usu l clin cal p cture

It ems rea nabl to specul te that som h therto undiscovered virus or group f vi es may cause the Guillain Barre syndrome It is well known th t the syndrome may be seen n p t ents exhibiting the *features of inf ct u mon nucleosi This man did n t* have the

lymphadenopathy splenomegaly sore throat atypical lymphocytes in peripheral blood or positive heterophil antibody titer—any one of which would have helped point to infectious mononucleosis—presumably a virus disease

Concerning the hypertension In the absence of eyeground findings congestive heart failure distended veins or urinary abnormalities I would doubt that hypertension was present as a primary etiologic factor I think it represents a sign of the nervous system disease but beyond that it does not help me make a specific neurologic diagnosis I have not found it mentioned in descriptions of the Guillain Barre syndrome

I shall close by mentioning two metabolic situations that might be responsible at least in part for this case (1) Porphyria could cause the widespread neurologic findings but the absence of abdominal or chest pain is strong evidence against it No family history and no history of dark urine is mentioned (2) While it is doubtful that chronic potassium depletion on the basis of undiagnosed renal disease could have brought about such a rapid and profound paralysis it is possible that hypokalemia could have developed while he was in the respirator and could have contributed to the paralysis Neither electrocardiograms nor serum electrolytes are mentioned in the protocol We will now hear from our neurologist

Doctor Keller It is convenient from the neurologic point of view to group the patient's symptoms into a syndrome of ascending motor and sensory paralysis with mild albuminocytologic dissociation Rather than using the words Landry-Guillain Barré Strohl syndrome one might more properly term this a myeloradiculoneuritis Many entities can give this picture some in more and some in less typical fashion A brief list would include rabies malaria diphtheria infectious mononucleosis periarteritis polycythemia sarcoidosis alcoholism, vitamin deficiency Devic's disease lead poisoning arteriosclerosis, diabetes, and trichinosis Particularly important are the reports that an ascending paralysis may precede the appearance of malarial symptoms Conversely mainly for interest it should be mentioned that in diphtheria such a syndrome may present up to four months after the initial diphtheritic infection with a high cerebrospinal fluid protein no cells, and particularly soft palate weakness and paroxysmal muscle weakness

With reference to this case there are some findings that are uncommon for a typical myeloradiculoneuritis, namely, the hypertension, the tendency for weakness to be greater on the right and the history of vomiting The first two features might be disregarded I guess transient hypertension has been reported in this syndrome and I see that the weakness is often more pronounced on one side The vomiting, however has not been observed in typical examples and was not mentioned in the literature Conceivably this could be a thing more than a result of inability to handle secretions but one should not

rational ze so quickly There i no history of abdominal cramping to suggest porphyria nor does the histo y or temperature support a toxic or septic reason for the vom ting

In summary a diagnosis of myel radiculoneuronitis of the typical L ndry-Guillain Barre Strohl type could readily be made with the reservations that some atypical feature are present and that th po sibility of two diseases being present should not be dismissed

D t B k The lln s was of ho t dur tion somewh t less than a month Early symptoms of chills and mal ise and inconclusively described sens y ch ng s apparently he alded m laria which was confirmed by l bor tory studie The patient s illnes however progressed onward to further symptoms of central nervous system i volvement despite r ut ne antimalarial tr atment One wonders about the possibility of cer b al m laria which has a high mortality rate Th re is a symptom complex of malaria r ported char cterized by sudden par pleg a with sensory disturbances frequently associated with fever N urological symptoms may include incontinence However the history strongly suggests Guillain Barre syndr me which is characterized by polyneuritis frequ nt nvolvem nt of the facial nerves and often includes glovelike nesthesia The general z d w akn ss the hyperesthesia and luggish reflex found in this case are commonly een The most confirm tory finding of course w s the incr a e in lbumin in the cer bro pinal fluid w thout evi dence of cellular eaction The v l e reported her is h gh enough to be of significance

Dr McDowell s diagnosis

Acute idiopathic polyneuritis (or Landry s paraly sis or Guillain Barré syndrome)

Dr Keller s d agnosis

Myeloradiculoneuritis of the typical Landry Guil lain Barré Strohl type

PATHOLOGIC FINDINGS

D t D r Po t mortem exam nation of this patient revealed n unobstructed tracheostomy The lungs were he vy and wet the right lung we ghed 645 grams and the left weighed 600 gram The tr chea and bronchi were filled w th thick tenac ous mucus The apexes of b th lungs we e lightly f brotic and contained s ver l mall calcific n dules The coronary arterie showed moderate the osclerosi The pleen was lightly congest d and we ghed 225 grams Along the less curvature of the tomach there were ulc rs mea ur ng from 4 mm to 3 cm n d mete

Aft r fle t n of the c lp a area of brown sh d sc loration was n ted in the r ght t mpo al muscle Th re was a linear fracture in the right tempo l b e which xtended n a horizontal direction Upon

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F g 1 Phot m cr graph f m mbr of bd l h m t ma how g part ally tact ytbr cyt on ner urfac of m mb an and th n-wall d a ular pace w th th memb a (100) (C urt y of the U S A my 406th M d cal G er l Labo atory)



F g 3 H gb mag f cat n f dor al sp nal oot bou g alt at my l b th and fl mmat ry f lt at on f ve (400) (C t y of the U S A my 406th M d al G eral Labo tory)

cytes This finding also has been described in acute idiopathic polyneuritis

Pathologic diagnoses

1 Acute idiopathic polyneuritis
2 Subdural hematoma, left temporoparietal area
3 Fracture, simple, complete, right temporal bone
4 Contusion, temporal muscle, right
5 Gastric ulcers, acute
6 Bronchopneumonia, terminal, acute
7 Atelectasis, bilateral, partial, due to mucous obstruction of bronchi
8 Malaria (a diagnosis on basis of clinical history only)
9 Arteriosclerosis, coronary arteries, moderate

COMMENT

Doctor Do ier At this time I believe it is well to consider the possible relationships between the various findings noted in this patient Whether or not the malaria was related to the other findings must I am afraid remain conjectural There have been reports of cases of Guillain Barre syndrome following fever therapy for gonorrhea [4] Whether fever may in instances bear a relationship to this syndrome similar to the relationship of fever and herpes simplex is certainly debatable

The relationship of skull fracture and the subdural hematoma to the acute idiopathic polyneuritis seems more definite In medical school many of us were told of a man who fell down a stairway sustaining a broken leg and who on complete examination was found to have diphtheria In that case the fall occurred because the individual was already ill the injury was apparent while the disease was inapparent In our case we have an apparent disease and an inapparent injury Weakness of the lower extremities is an early symptom of Guillain-Barré syndrome and falls during this stage of the disease are easily sustained The slight atelectasis plugging of bronchi with mucus and early bronchopneumonia appear to be related to the paralysis with absence of coughing and consequent poor bronchial drainage

The cause of acute idiopathic polyneuritis is not completely understood It may well be a syndrome of multiple etiologic factors with a pathologic condition representing a reaction common to injury by a variety of agents Edema of the nerves at the point of their exit from the bony confines of the central nervous system has been suggested as a factor in the pathogenesis of the disease A virus etiology has been repeatedly considered but all attempts at virus isolation including those made in this case have thus far failed Waksman and Adams reported the experimental production of a syndrome in rabbits morphologically and clinically resembling Guillain Barre syndrome They accomplished this by injecting homologous and heterologous sciatic nerve extracts with an adjuvant A case of Guillain-Barré

syndrome following smallpox vaccination was reported recently and there are reports of the syndrome following the administration of anti rabic serum typhoid paratyphoid vaccine tetanus antitoxin pertussis vaccine antipneumococcic vaccines human serum and para amino-salicylic acid These reports have led to the strong argument for an immunologic origin for this disease but there is at present certainly nothing definite about the cause of this syndrom

D t M D w ll This has been a most interesting and provocati e case I would like to ask our neurosurgeon to comment on the unex p cted findings here

D t H ly First of all I wish to st te that I did not see th s patient It is hard to tell in retrospect but if we d dn t have the utopsy findings a lot of the symptoms could have been attributed to acute idiopathic polyneuritis There were no headaches and no pap lledema It is probable that the subdural hematoma would have had to be more massive to lead to de th by it elf Intracranial pres ure was not very high—168 mm of saline—which is normal The history is n t typical of a massive subdural hem tom —no trauma was known This cas shows the importance of h ving a *c mplete* autopsy If you hadn t gone on to section th gangl a and spinal roots somebody might have attributed the entire clinical picture to subdural hematoma We must conclude th t the man had two independent diseases

D et Z ll Yes, the complete autopsy is essential to the argument for two diseases—the subdural hematoma alone could have adequately explained the elevated spinal fluid protein

REFERENCES

1 S h ll W F My l t I B k A B (d) *Cl al N urol gy* Ha p & B h N w Y k N Y 1955 1 3 Ch 30 pp 1449-1497

2 W l m H W d K h J W D f pe ph l I B k A B (d) *Clini al N urol gy* H rp & B th N w Y k, N Y 1955 1 3 Ch 32 pp 1563 1640

3 M l mud N *Atlas f N uropath l gy* U ty f C l f ni P B k l y C l f 1957 p 88

4 Garv y P H J s N d War S L P ly d l ur t (G ll in B y d m) f ll w g us f ulf l mid and f h py *J A M A* 115 1955-1962 D c 7 1940

5 W k m B H d Ad m R D All g ur p m l d as f bb duc d by nj t f p ph l rv us t d dj *J Exper M d* 102 213-236 Aug 1955 C t d f 6

6 Kur h A L Guill B y d m f ll wing m llp na R po t f *New England J M d* 258 83-84 J 9 1958

M j G n-F un t H ly MC USAR hi f ur urg l

Near Fatal Anaphylaxis From Typhus Vaccine

R. LEWIS WRIGHT *Lieutenant MC USNR*

THE so-called anaphylactic reaction in animals that can follow repeated administrations of a foreign protein has been known for several decades The exact pathophysiology of this reaction is still not completely understood For years physiologists have induced such responses in lower animals for both experimental and demonstration purposes These reactions rarely have been seen in man Formerly they occasionally were seen following administration of various antiserums or antitoxins containing horse serum or other proteins of animal origin Within the past 15 years these serums have been used less frequently, but such reactions have been noted following injections of newer preparations such as penicillin and vaccines prepared by egg yolk sac or embryo culture methods

CASE REPORT

A 33 year old white man was admitted to sick bay on the U S S *Northampton* on 6 February 1958 complaining of a skin rash and itching Fifteen minutes earlier he had received a 1 ml booster subcutaneous injection of typhus vaccine inasmuch as the ship was *en route* to Europe Since early childhood ingestion of eggs had been followed by nausea and vomiting The patient had always taken the recommended vaccines despite a warning that certain ones were not recommended for egg sensitized individuals He had received typhus vaccine on four previous occasions (1950-1956) three injections of yellow fever vaccine (1943 1953) and two of influenza vaccine (1955 and 1956) with no untoward effect

On admission there was extensive generalized urticaria The patient was alert co-operative and was complaining of *intense* pruritus An injection of 50 mg of Benadryl (brand of diphenhydramine hydrochloride) was given intravenously Following this a capsule containing 50 mg of the same drug was given by mouth There was dramatic immediate relief of pruritus and regression of the urticaria Within a few minutes the patient became drowsy and wanted to lie down This was attributed to the sedative effect of the antihistamine For over an hour he slept quietly and all seemed well until audible laryngeal stridor appeared On uncovering the patient, fasciculations were noted *in the*

From U S S. *Northampton*, FPO New York N Y

muscles of all extremities and his spine was n a position of hyper-extension Attempts to rouse him were unsuccessful At this time h s pul e rate was 134 per minute respirations 8 per minute and labored and blood pressure 80/? mm Hg Auscultation of the chest revealed coarse wet rales throughout both phases of respiration A 0 5 ml injection of epinephrine 1 1000 was given subcutaneously For 10 minutes there was no apparent change and the patient appe red moribund As a small intravenous dose of epinephrine was being prep red his stridor became less marked respir tory rate inc eased to 12 per minute and hi blood pressure rose to 90/70 mm Hg The patient remained in a state of hyperextension but began to respond somewhat incoherently to simple comm nds Another subcutaneous injection of epinephrine was given 20 minutes after the first one Within the next half hour he improved r pidly and vital signs reverted to normal with the exception of a persi tent tachycardia of about 110 per minute Because of the severity of the allergic reaction and initi l tr nsient mprovement with the antih stamine followed by an exace bation of the anaphylax s it was elected to begin stero d therapy Cortisone 150 mg was given intramu cularly for thre day and later in gradu lly decreasing amounts until it w s discontinued For several days the patient complained of soreness in the cervical and lumb r paravertebral muscles but this gradually subsided nd the rema nder of his convalescence was un eventful At the time of this writing 10 months later he remains in good health

COMMENT

Present day typhus vaccine is prepared according to the meth od of Cox and contains a killed suspension of *Rickettsia prowazeki* grown on the yolk sac membrane of the chick Conceivably an allergic reaction to such a vaccine might be caused by sensi tization to either the rickettsial bodies or to yolk sac fragments Cox believes the latter to be more likely Clinical evidence is in accord with this conclusion as each of the reported cases of anaphylaxis from typhus vaccine occurred in an individual who was allergic to egg yolk [6]

The case reported here is interesting and unique in several respects It occurred in a patient who had received typhus vac cine previously The other patients developed anaphylactic re actions following their first injections of the vaccine It is proba ble that the early intravenous administration of Benadryl delayed the reaction The reaction reached its peak in about 90 minutes in previously reported cases the reaction occurred in from a few seconds to 30 minutes with one exception [7] In retrospect perhaps it would have been wise to have administered epinephrine initial ly At that time however urticaria was the only allergic mani festation and it disappeared promptly after the intravenous in jection of the antihistamine

SUMMARY

A case of severe anaphylaxis following subcutaneous admini stration of typhus vaccine is reported This occurred in a patient

with a long history of allergy to eggs who had received multiple previous injections of egg prepared vaccines with no ill effects Review of the literature shows that less than 12 similar cases have been reported Of these, two have been fatal [6-8] It cannot be emphasized too strongly that egg prepared vaccines should not be given to persons with a suspected allergy to eggs and that, wherever and whenever such vaccines are given, appropriate emergency drugs such as epinephrine or the antihistamines should be available immediately

REFERENCES

1 Cox H R U of yolk c f dev loping chick embryo as m dium for growing Ri k tts of Rocky M unt in sp tted fev r nd typhus gro ps *Pub Health Rep* 53 2241 2247 D c 23 1938

2 Cox H R. Cit d in Roth V E Reactio s to typh va cin *Bull U S Army M. Dept* (No 88) 111 113 M y 1945

3 H mpt n S. F Anaphylactic hock gg e siti e ind v dual f llowing v c- in ti n w th typh s v cin study of ntigenic rel ti ship of eggand chi k n m t a tig ns nd typhu v cci *J Lab & Clin. Med.* 32 109-117 F b 1947

4 Park R. G All rgy to egg pr par d vacci *B st M. J* 2 570 Oct 27 1945

5 Plotz H All rge c a d an phyl ct g n prop rt e of v cin s prep red f m mbryon t s of d v l p g chicks kin sen t vity f ll wing s b tan o inocu l ti n f typhus- acc man *J Immunol.* 53 315 319 Aug 1946

6 Rifk H. De th d t dmin str t n of typh s v cc e *Arm. Int Med* 25 346-350 Aug 1946

7 Spr gu H B nd B r rd J H Egg ll rgy sig f c nc in typhu d yellow f v r mmun z ti n *U S Nav M. B ll* 45 71 74 July 1945

8 W lk r R H Fatal a phylaxi f llow g typh s ci nj ctio *U S Nav M. Bull* 48 303-305 M r Apr 1948

PROGRESS IN PSYCHIATRY

Dramatic developments have occurred in American psychiatry in the past five decades Advances in dynamic psychiatry individual psychotherapy group psychotherapy administrative techniques and architecture and the advent of professional adjunctive services have contributed tremendously to the prevention and cure of psychiatric illness Early intensive treatment results in the recovery of patients previously considered to be incurable At the turn of the century the practice of psychiatry consisted primarily in the philosophical contemplation of nervous and mental disease The psychiatric hospital private or public was in fact a place where the mentally ill patient could seek asylum from a nonsympathetic public Today it need no longer be true that the psychiatric hospital is simply a warehouse for the bodies of psychiatrically ill people —Perry C Talkington Psychiatry in Texas (editorial) *Texas State Journal of Medicine* November 1958

AMA MILITARY MEDICINE SECTION PRESENTS ANNUAL PROGRAM ATLANTIC CITY 9 11 JUNE

The program of the Section on Military Medicine promises to be an outstanding feature of the annual meeting of the American Medical Association in Atlantic City during the second week in June according to Rear Admiral Alphonse McMahon MC USNR (Ret) associate professor of medicine at St Louis University School of Medicine chairman for 1958 1959 The section will meet in the afternoon on 9 10 and 11 June in Room A of Convention Hall

A unique presentation in the program will be an original three act dramatization of events which might occur if the United States sustained a major nuclear weapons attack Three other audio visual presentations will be devoted to biodynamics research in the Air Force practice of medicine in the antarctic and problems of chronic cold exposure Dr Frank B Berry Assistant Secretary of Defense (Health and Medical) will report on the activities of his office and Brig Gen Floyd L Wergeland MC USA will discuss Medicare The program will open with a symposium on medicine in the jet and space age



Admiral McMahon



Capt Schultz



Col Bramlitt

In addition to Admiral McMahon the officers of the section are Major George H Houck MC USAR Palo Alto Calif vice chairman Col Charles H Bramlitt USAF (MC) Washington D C secretary Col Charles L Leedham MC USA (Ret) Cleveland Ohio delegate and Captain Robert V Schultz MC USN Washington D C representative to AMA scientific exhibit The military departments will award retirement point credits to reserve Medical Corps officers on inactive status who attend the meeting The complete program follows

Tuesday 9 June 1959—1 15 p m

Business meeting (election of officers)

Symposium on Medical Problems in the Jet and Space Age—*Brig Gen Donald D Flickinger USAF (MC)* Surgeon and Director of Life Sciences Air Research and Development Command Andrews Air Force Base Washington D C moderator

The Impact of Space Exploration on Biology and Medicine—*W Randolph Lovelace II M D* Director Lovelace Foundation for Medical Education and Research Albuquerque New Mex

Physiological Aspects of Hyper and Hypogravic States—*Capt Julian E Ward, USAF (MC)* Chief Biomedical Division Air Force Ballistic Missile Division Air Research and Development Command Inglewood Calif

Medical Aspects of Space Ambient Radiations of Extraterrestrial Space—*Col Paul A Campbell USAF (MC)* Chief Space Medicine Division U S Air Force School of Aviation Medicine Randolph Air Force Base Tex

Life Support System for Space Vehicles—*Lt Col Stanley White USAF (MC)* National Aeronautics and Space Administration Langley Research Center Va

Medical Criteria in Space Crew Selection—*Capt George E Ruff USAF (MC)* Chief Stress and Fatigue Section Aero Medical Laboratory Wright Patterson Air Force Base Ohio

Medical Investigation Following Overseas Civil Airline Accident—*Capt William M Crafft MC USN* U S Naval School of Aviation Medicine Pensacola Fla

Military Disability Retirement Problems for Regular and Reserve Officers—*Col Walter H Moursund Jr MC USA* Chief Physical Standards Branch Office of The Surgeon General Department of the Army Washington D C Discussed by *Col. Russell S Leone USAF (MC)* Chief Physical Standard Division Office of The Surgeon General Department of the Air Force Washington D C and *Capt E E Hogan MC USN* Director Physical Qualifications and Medical Records Division Bureau of Medicine and Surgery Department of the Navy Washington D C

Medicare—*Brig Gen. Floyd L Wegeland MC USA* Executive Director Office for Dependents Medical Care Washington D C

Activities of the Office of the Assistant Secretary of Defense (Health and Medical) During the Past Year—*Frank B Berry M D* Assistant Secretary of Defense (Health and Medical) Washington D C

Wednesday 10 June 1959—1 30 p m

Chairman Address—Communication A New Challenge—*Rear Adm Alphonse McMahon MC USNR (Ret.)* St Louis University School of Medicine

Stroke—An Audio-Visual Presentation in Three Acts *Brig Gen Harold C Lueth MC USAR* Evanston Ill moderator

ACT I Reveille—Before and a few hours after

Panelists *Col. Albert J Glass MC, USA* Chief Psychiatry Consultant Office of The Surgeon General Department of the Army Washington D C *Waltman Walters M D* Mayo Clinic Rochester Minn and *Col John R Hall MC USA* Fort Lesley J McNair Washington D C

ACT II Fatigue—The next few days

Panelists *Rear Adm. Wendel G Scott MC USNR* Saint Louis Mo *Lt Col James B Hartgering MC USA* Division of Neuropsychiatry Walter Reed Army Medical Center Washington D C *Col Albert J Glass MC, USA* Chief Psychiatry Consultant Office of The Surgeon General Department of the Army Washington D C moderator

M d cin Walt t R d Army I st tut of R ar h W hington
D C and *Lt C l G W Crow ll USAF (MSC)* Ch f P g ms
B an h Off of Th Surg G l D p rtm t f th A r
F W h gt D C

ACT III T p —M ch l t r

P l t *C l R b t L H ll ngh t MC USA* R e h and
De l pm t C mmand Off c f Th S g G n l D p rtm t
f th A my W hingt D C *B g G R h d L M tl g*
AFR (MC) (R t) A t D t Th H lth Ce t Oh
S t U ty C l mbu Oh o *M j Ch l C P l y MC*
USA A my M d l S rv S h l F rt S m H ton T and
Col J m s T McG b y MC USA I d tri l C ll g f th A m d
F Fort L l y J M N W h gt D C pan l t

Thursday 11 June 1959—1 15 p m

S m A p t f Al F Bi dy mi R h—*C l J h P St pp*
USAF (MC) Ch f A to M d l L b t ry W ght P tt A F
B Oh *C pt. Edward L Brown, USAF* Ch f C w St t Se t
A M d l L b to y W ght P tt A Fo B Oh d *C pt*
El B d g USAF (MSC) B odyn m B anch A t M d c l F ld L b-
t ry H ll m A F c B N w M

P ti f M di i th Ant ti

T m and S gl l A p t f M d l C i l l t d C ld W th
E i m t—*J l D bk M D* U S N l A St t Quon t
P t R I

M di l C id ti i th S l t f P l t Li l l
lated C ld E iro m t—*H w d C T yl III M D* N w H en Con

G ol M d l P bl m f C ld W th P ti d Ch ic C ld
E p —*P t B U g M D* Ch p l H ll N C

M S i l i a C ld E i m t—Th Phy i l gy d A at my f
f C ld W ath M di i —*Bryan C D It M D* B ooklin M

P y hi t i P bl m f E t m l l ti i th A t ti —*Ch l S*
M ll J M D U S N l H sp t l Ph lad lph Pa.

MILITARY PANEL ON OPTOMETRIC EXAMINATION

A panel on Factors in Develop ng a Minimum Optometric Exami nat on for Military Personnel w ll be present d t the 62d Ann l Congress of The American Optometric Association Statler Hilton H tel D llas Texas 28 June thro gh 1 July 1959 Part cipants will nclud M jor D Russell Reed MSC USAR Captain Lester R Loper USAF (MSC) Commander Robert L Henry MSC USN and Lieutena t Colon l loh W Sh d n MSC USA On the l st day of the meeting a sympos m Medical Se vice Corp T nd will be presented by the ch fs f th three M dical S rvice Corps Colonel Bern rd Aabel MSC USA C p Leo J Elsas er MSC USN and Colon l L onard P Zagelow USAF (MSC)



MAN IN SPACE Major General Oliver K Niess USAF (MC) Air Force surgeon general is literally floating in space during a weightlessness experiment in a C 131 aircraft Colonel John P Stapp USAF (MC) chief of the Aero Medical Laboratory at Wright Air Force Base Ohio where the flight was made in the specially modified Convair transport is in the background Maximum duration of the total absence from the normal pull of the earth s gravitational force during these flights was 15 seconds During orbit around the earth or in free space flight space crews are expected to remain weightless for periods ranging from hours to months or even years

COMDP KEENER HONOPED BY WIVES WING

Lieutenant Commander Mary F Keener MSC USN an aviation physiologist stationed at the U S Naval Air Station Barbers Point T H has been selected for honorary membership in the Wives Wing of the Aero Medical Association for her contributions to aviation medicine The award will be made at a luncheon of the ladies auxiliary of the Association on 28 April during the thirtieth annual meeting at the Statler Hilton Hotel Los Angeles Commander Keener a native of Attala Alabama is credited with having instructed more naval aviation personnel in the use of oxygen equipment night vision ejection seat procedures and low pressure chamber indoctrination than any other aviation physiologist She is a graduate of the University of Alabama and has been on active duty since January 1942

MAJOR BERREY HEADS PEDIATRICS COMMITTEE

The first tri service committee on military pediatrics has been established recently by the executive board of The American Academy of Pediatrics Major Bedford H Berrey MC USA Office of Dependents Medicare Washington D C has been named committee chairman Members of the committee a e Captain William I Neikirk MC USN chief of pediatrics service U S Naval Hospital Philadelphia P Commander Frederick B Becker MC USN assistant chief of p diatrics servic U S Naval Hospital Portsmouth Va and Major Thomas M Holcomb USAF (MC) chief of pediatrics service U S Air Force Hospital Lackland Air Force Base San Antonio Tex The committee s scope includes the fostering of high standards of pediatric tr ining through liaison with the respective surgeons general and The Academy of Pediatrics stimulating study and rese rch into the practice of pediatric especially in the unif rmed services A meeting of the new committee will be held during the annual ession of the Academy of Pediatrics in Chic go Ill 5 8 October 1959 Medical officers specializing in pediatr cs are nvited to attend



M j B y

DR MIDDLETON REAPPOINTED VA CHIEF

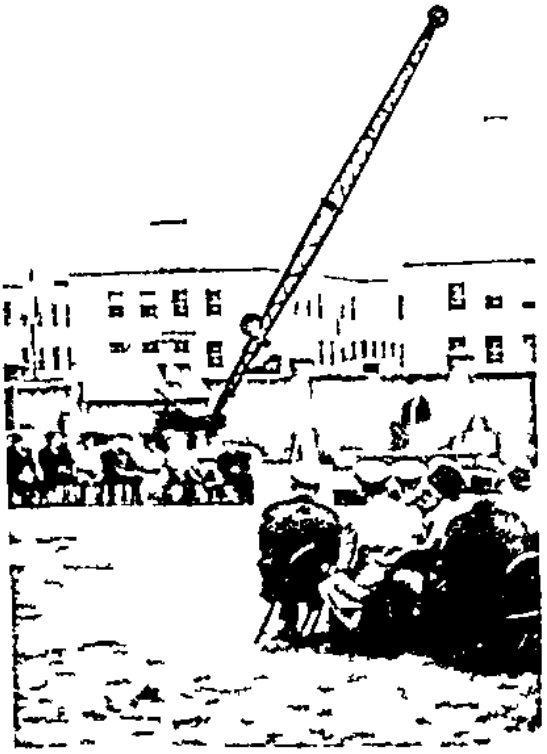
Dr William S Middleton an honorary colonel n the U S Army Reserve has been reappointed chief medical director of the Veterans Administration for a second four year term effective 1 March 1959 Formerly dean of the Univer ity of Wiscons n Medical School and a veteran of both World Wars he head the VA s 171 hospitals nearly 100 outp tient clinic and home town medical services which pro v de care for more than 2½ million patients yearly

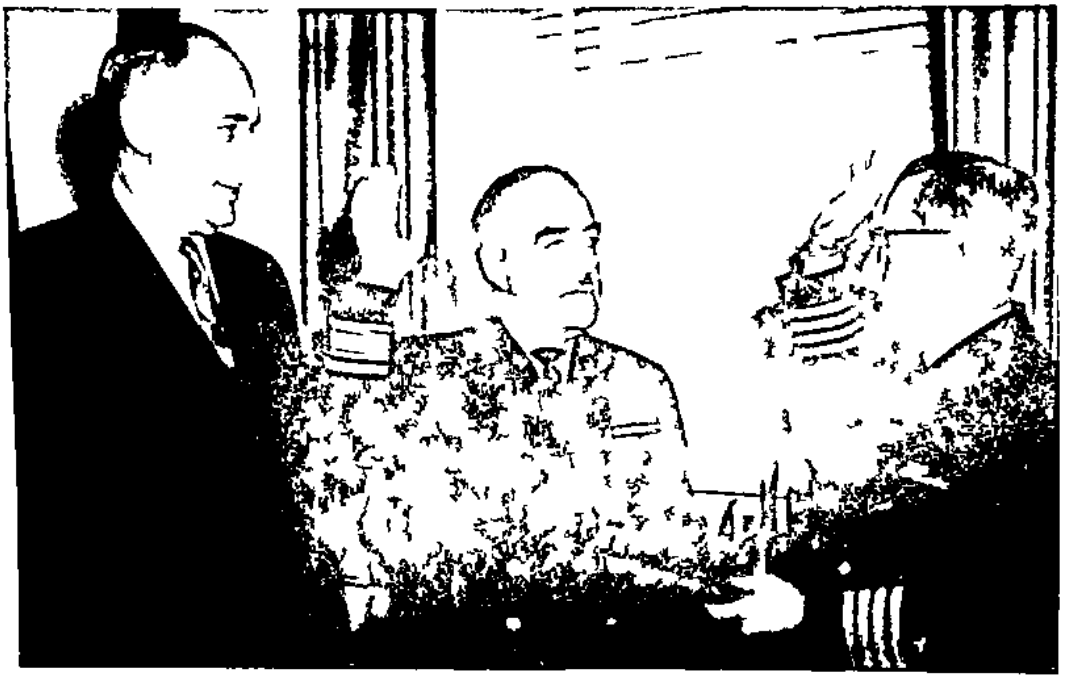
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MEND SYMPOSIA HELD IN MARCH AND APRIL

Faculty members of med c l school particip ting in the program of Medi al Education fo Nat onal Defense (MEND) attended a symposium on Med l Ope tio s and Research in Climatic and En ironmental Ext mes at the U S Naval Med cal School Bethesda Md 4 6 March Another MEND symposium under Air Force ponsorship is scheduled at the Aero Medical Labor tory Wright Patterson Air Force Base Oh o 8 10 April Captain Bennett F Avery MC USN is na tional co- dinato of MEND

CEREMONY Dr Frank B Berry Assistant Secretary of Defense (Health and Medical) addressed a group of distinguished guests and visitors on 17 December during the ground breaking ceremony for the new college building of the Industrial College of the Armed Forces Fort Lesley J McNair Washington D C With him on the platform are Lieutenant General George W Mundy USAF (left) commandant of the Industrial College and Major General Emerson C Itschner USA Chief of Engineers U S Army Dr Berry assisted by General Mundy turned the first shovel of earth at the site of the new building





REAPPOINTED Rear Admiral Bartholomew W Hogan MC USN took the oath of office for reappointment to a two year term as Surgeon General of the Navy and Chief of the Bureau of Medicine and Surgery during a ceremony on 13 February in the Office of the Secretary of the Navy Administering the oath is Captain Wilfred A Hearn USN Assistant Judge Advocate General as the Honorable William B Franke Under Secretary of the Navy looks on

NAVY PHYSICIAN PILOT GIVEN DECORATION



L t ant Tabo

Lieutenant R ch rd H Tabor MC USN has been awarded the Navy Commendation Ribbon with Metal Pendant at the Naval Air Station Oceana Virginia Beach Virgin a for his outstanding perfo mance of duty while serving as flight surgeon and test of ficer on the av ator s full pressure suit pro ject Subjecting himself to extreme simulated altitudes during a 72 hour period in a low pressure chamber Lieutenant Tabor was able to determine observe and report ac curately and objectively the biologic l ef fects incident to th s te t p oviding valu able information rel ting to the future im provement of the full pressure suit A naval avi tor since 1943 he is a 1952 gradu te of the University of Cincinnati College of Medicine Follow ing con pletion of an nternship at the U S Naval Hospital San Diego California he attended th U S N val School of Av ation Medic ne at Pensacola Florida

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CAPT SCHIFF WINS HARRIS P MOSHER AWARD



Capt S h ff

Capta n Maurice Schiff MC USN head of the eye ear nose and throat service at the U S Naval Hospital Oakland Calif has been named recipient of the Harris P Mosher Memorial Aw rd for the best medical thesis submitted to the Ameri can Laryngological Rhinological and Otological Society and has been elected to active membership of the soc ety Cap tain Schiff read h s prize winning p per *Juvenile Nasopharyngeal Angiofibroma* at the annual program of the society t The Homestead n Hot Sp in$_o$s Va on 12 March In hi present ss gnment since 1955 he lso serv s on the teaching staff of the University of Californ a Medical Cent r San Franc sco Calif

A Message From the A M A

This is the second and concluding part of a report on the results of a continuing opinion survey of physicians released from active military service The first part of this report appeared in last month's issue of the *U S Armed Forces Medical Journal* This summary is based on 1,167 returns received in 1957 A total of 2,005 questionnaires were distributed by the Council on National Defense of the American Medical Association

Physicians Evaluation of Staffing Conditions One of the questions was designed to obtain the opinion of physicians as to staffing conditions of nurses, enlisted medical personnel, physicians, dentists, and others at the two units where the physician served his longest and next longest assignments With respect to the longest assignment, the tabulation of this multiple answer question revealed that in the Army replies indicating overstaffing totaled 160 understaffing 339 and adequate staffing, 690 In the Navy, overstaffing totaled 165 understaffing, 239 and adequate staffing, 615 The Air Force tabulation revealed 314 replies indicating overstaffing 749 of understaffing and 1 157 of adequate staffing

The response to the question concerning the next longest assignment showed that in the Army, overstaffing totaled 78, understaffing 126 and adequate staffing, 429 In the Navy the results were 84 115 and 407 respectively, while the Air Force tabulation was 106, 205, and 510 respectively

Physician overstaffing in the Navy and dentist overstaffing in the Army and Air Force predominated in regard to the longest assignment Physician overstaffing led in the Army and Navy and dentist overstaffing led in the Air Force with respect to the next longest assignment On the longest assignment enlisted medical personnel and dentists were second and third, respectively, in regard to overstaffing in the Navy, while physicians and enlisted medical personnel were second and third in both the Army and the Air Force On the next longest assignment dentists and enlisted medical personnel were second and third, respectively, in the Army, while enlisted medical personnel and dentists were second and third, in the Navy In the Air Force physicians and enlisted medical personnel were second and third, respectively, as to overstaffing, on the next longest assignment

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From the Council on National Defense of the American Medical Association Views and opinions presented are not necessarily those of the Department of Defense —*Editor*

Unnecessary Aspects of Military Training There were 334 physi cians who responded affirmatively to the question, Were there any aspects of your military training that were unnecessary or wasted? Negative answers were received from 833 medical officers With respect to the affirmative replies, the most fre quently mentioned area of waste was the performance of non medical duties In the Army 30 per cent of those who responded affirmatively were of that opinion as were 23 per cent of those in the Navy and 42 per cent of those in the Air Force

Making Military Service More Attractive A total of 1 051 physi cians offered suggestions for making military service more at tractive to physicians Only 110 physicians thought that nothing could be done to make military service more attractive to med ical men In the 1956 survey the number one suggestion was a recommended improvement in the utilization of medical person nel while the 1957 survey reveals a recommended increase in pay as the most frequent suggestion for making military ser vice more attractive to medical men The 1956 number one sug gestion as well as a recommendation of adequate family housing did not appear as one of the top ten suggestions in the results of the 1957 survey Choice of stable location was the second most frequent suggestion from physicians in all branches Less administrative non medical duties was third as the suggestion of Army and Navy physicians while more capable commanding officers was third for the Air Force

Improvement of Services t Military Physicians by Medic l Associ ations A total of 397 physicians (34 per cent) offered sugges tions in response to the question concerning the role of national and local medical associations in maintaining closer contact or rendering better service to their members who served as physi cians in the Armed Forces Some physicians offered more than one suggestion The other 770 physicians who returned the questionnaire offered no suggestions The most frequently sug gested improvements in service were (1) more personal visits by civilian physicians to evaluate grievances (2) more invita tions to military physicians to civilian medical meetings and (3) the dissemination of more information to military physicians

Physicians Who Would Voluntarily Rema n in Service In response to the question relative to military service beyond the obligatory tour of duty 675 physicians indicated they would not be willing to stay in military service for more than two years under any con ditions except total war There were 492 physicians who said they would serve an additional period under certain conditions Some physicians listed more than one condition The most fre quently listed condition was increase in pay followed by choice of stable location choice of duty assignment and op portunity for residency or further training

Preferred Branch of Service for Practice of Medicine In response to the question of preference if the physician were going to practice medicine in a Federal Government Agency, 453 physicians stated a preference for the Armed Forces A total of 436 physicians expressed a preference for other agencies of the Federal Government, while 248 physicians had no preference and 30 did not answer this question Of those who preferred the Armed Forces, the majority chose the branch of service in which they had served

Distribution by Rank at Time of Discharge The majority of physicians in the Army and Air Force held the rank of captain at the time of their release from active military duty, while those separated from the Navy held the equivalent ranl of lieutenant, senior grade The 1956 survey revealed that the majority of Navy physicians held the rank of lieutenant, junior grade, at the time of separation There were 1 102 physicians who answered this question The 1957 survey indicated that approximately 2 per cent of those who reported were in the lowest rank, while 85 per cent held the rank of captain (Army or Air Force) or lieutenant, senior grade (Navy) There were approximately 1° per cent with the rank of major or lieutenant commander, and higher

Length of Active Service as Medical Officer In the Army, 308 responding physicians served an average (median) of 23 months in the United States, and 152 responding physicians served an average (median) of 21 months at overseas stations There were 279 Navy medical officers who had an average (median) of 24 months active duty in the United States, and 108 Navy medical officers had an average (median) of 12 months overseas Responses from 545 physicians in the Air Force revealed an average (median) tour of duty of 24 months in the United States The average (median) tour of duty at overseas bases for 194 physicians in the Air Force was 22 months

Reserve Status Of the 1 167 physicians reporting 193 said they retained their reserve commissions, while 972 resigned their commissions There were 2 who did not respond By services, the Army had 68 retaining commissions and 247 resigning the Navy had 44 retaining and 236 resigning and the Air Force had 81 retaining and 489 resigning their commissions

OFFICIAL DECORATIONS

The following awards were recently announced by the Department of the Air Force

Legion of Merit

J ck C C rmi h l C l USAF (MSC) Ge rge M Kne f Col U

Officers Certified by Specialty Boards

The surgeons general of the military medical services have announced that the following regular Medical Corps officers have been certified by the boards indicated

American Board of Orthopedic Surgery

Dun k l W ll m C J Maj USA
M D ld W ll m F L C l USA
Om G g E J M j USA
Ph pp W ll m G M j USA
S dr R b rt L M j USA
W d d G g S J M j USA

American Board of Pathology

Patholog c Anatomy

J ffur W ll m J C p USA
R y J hn P J Cap USA
Sul k M h l H M j USA
Wh t D d C M j USA
Wdh Gl E C p USAF

American Board of Radiology

Dun g W ll m A C p USAF
Sp g R y A C p USAF
Th ma Mart A Cap USAF

Nucl a Medicin

C wg ll H b F Maj USA
K G yl d S C p USA

American Board of Surgery

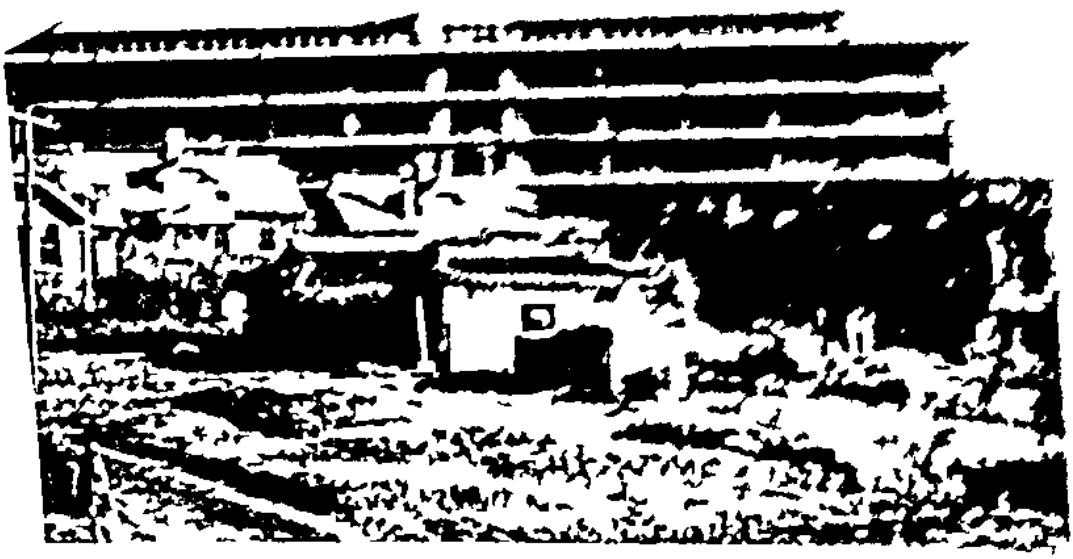
And w Sam l E L C l USAF
Gl w Do ld H. J M j USA
McK Ch l L M j USAF
P p J m K M j USA

Deaths

MITCHELL B b Ra L enant NC USNR f Omah N b en t t U S N l H p l G m M I f d ty g d d 1950 f m L y l School f N g (S t An H p l) Ch g Ill pp t d e g th U t d S t N l R rv R po t d f t d ty 20 J ly 1951 l d f om t d ty o 19 J ly 1953 R t med t ctl d ty on l M r h 1957 w th nk f l t t (j g d) d ed 15 J ry 1959 g d 29 Alt m t Cal f f b m

MOSELEY H ry Gl ddng C l l USAF (MC) f D C l gn d 1002d I p t G l G p N rt Atr F c B C l f g d t d in 1938 f m W hng on U e y S h l f M d St L M pp int d f t l enant th Army f th U d St t 7 Jun 1938 port d f t d ty 5 J ly 1939 mm d f l t ant in th U ted St t Army 14 F b y 1940 t f d t th U t d S t Atr F l J ly 1949 d d 10 F bruary 1959 g d 51 ar N rto A F B Cal f mil t ry c ft dent

TOEWS S W L ut t NC USNR Mi p l s Minn ut t U S N al H p t l Guam M I f d ty gr duat d 1946 f m Sam tan H p l S h l f Nur g Namp ld h pp ed l ut t th U t d S t N val R rv and port d for t d y 30 Jun 1955 d d 6 F b ary 1959 g d 40 t T pl Army H p t l H lul T H f pb l m l d thr mb



The Eighth U ted States Army Chest Memorial Hospital Seoul Korea

tremendous tuberculosis problem among the Koreans At that time as you may recall the war had come to a standstill and there was a great deal of military equipment that was becoming available and might continue to do so if the war did not flame anew A rather extensively planned proposal was presented to utilize a great deal of this equipment and encourage its use in the care of patients with tuberculosis Actually this plan was I am sure far too great to implement at that time however within the course of the next few months the Presid nt

of the United States made available to the Eighth Army Commander in Korea an appreci ble sum of money—some 15 million dollars—to help in the rehabil tation of Korea It was not permitted to spend this money for the actual labor involved in the building of any structure but materials could be purchased

Along about this time Major General Paul Robinson came to Korea and was n med the Eighth Army Surgeon General Taylor was then the Eighth Army Commander and he was looking for recommendations which would result in a su table memorial to the Eighth Army The



From l ft t ght D G o g Pa k P d t Y w S U tty S l G al Maxw ll D Tayl Ch f of St ff U S A my D E t W W t M d al M ry M thod t M n, S ul G al Geo g H D k Command g General H adq t 8th U S A my Seo l Lt Gen l R b t M Ca D p ty Comma d r- Ch f U S A my P f and D Y S L Super t ndent Sev H p t l Seo l K a.

idea of a chest hospital as a memorial to the E ghth Army in Korea w s p esented to him Gen ral Taylor ccepted the proposal nd made available about $500 000 including some $100 000 for the equ pment of the operating room su te Th t money was turned over to the Mission which Dr Weiss an American physician heads in Seoul This Mission then added to that sum approxim tely $250 000 for the labo and furnished a tra ned architect to work with the Army engineers I under stand that the building is n w completed

Many people in the Eighth Army e rly in 1954 or thereabouts did a great deal to make this hospital possible in that there was only a hort t me available to accept and obligate the f ds The M ssion I th nk did a ery fine thing to get a quarter of a m llion dollars from th ir home offic on a ery short not ce and I am sure the Eighth Army ha cont nu d to manifest cons derable interest in this project

JAMES H FORSEE
B gad G l MC USA
W lt R d Army H p tal
W h g on D C.

Book Reviews

MEDICAL DEPARTMENT UNITED STATES ARMY PREVENTIVE MEDICINE IN WORLD WAR II Communicable Diseases Transmitted Chiefly Through Respiratory and Alimentary Tracts Volume IV Prepared and published under the direction of Major General S B Hays The Surgeon General United States Army Editor in-Chief Colonel *John Boyd Coates Jr* MC USA 544 pages illustrated U S Government Printing Office Washington 25 D C. 1958 Price $5 50

From Cicero to Winston Churchill it has been said that to look ahead one must first look back History thus becomes one of the most practical of all studies and certainly sound planning for the future can only be based on a knowledge of past mistakes and successes It has therefore been sound medical statesmanship to maintain such historical studies as this and a permanent medical historical unit to make them This volume is a good example of the value of such studies In it there has been collected and subjected to analysis a vast amount of information indispensable for future planning as well as a source of information for historians The book is very complete in covering the infectious diseases of the respiratory and gastrointestinal systems Emphasis has been placed on their prevalence both at home and in the various war theaters and on immunization and protective measures The entire volume is full of information of vital importance to military planning and indeed to civilian preventive medicine The numerous table and charts are well designed and present the facts so they can be easily used The binding paper and typography are splendid

—*LOUIS H RODDIS Capt MC USN (Ret)*

PROGRESS IN NEUROLOGY AND PSYCHIATRY An Annual Review Volume XIII edited by *E A Spiegel* M D 611 pages Grune & Stratton Inc New York N Y 1958 Price $12

A large outpouring of professional medical literature makes it difficult for even the specialist in a relatively narrow field to keep abreast of changing concepts and recent advances in his specialty and its related basic sciences For this reason there has arisen a need for an annual survey of published literature which endeavors in a single volume to review the most significant or important contributions in this or that clinical specialty The book under consideration is the thirteenth of an annual review series in neurology and psychiatry It is an ambitious undertaking of 25 chapters which encompass the published literature in clinical neurology neurosurgery psychiatry and the basic disciplines of neuroanatomy neurophysiology neuropathology and neuropharmacology In general the editors and contributors have performed their difficult task in a most commendable manner Approximately 4 000 articles and books are reviewed some with only one line of comment which gives not much more information than the title of the paper itself while for others a paragraph or more is devoted which includes the reviewer s critical evaluation From the standpoint of the clinical neurologist or psychiatrist per

haps the major criticism conce n the organization and readability of some of those chapters p rticularly tho e devoted to the basic sciences I ere findings of ari us research repo ts are giv n with little or no comme t upon th r val dity or significance It is un c mmon for the aver ge clinic an to be sufficiently familiar with methodology and te minology of the newer technic in neurophysiology neurochemistry nd neuroph rmacology so th t he can obtain useful information from m ager reporti g in those field Most h lpful were those chapters where the rev ewer made special efforts to integrate and organize the m terial with his own comment and evalu t n De spite these shortcom ngs th bo k is recommended for neur logists and psychiatrists for it contai s a wealth of inform tion relevant to their major areas of interest However they should expect to de ote con derable t me in c refully p sing its contents

—*ALBERT J GLASS C I MC USA*

NUTRITION AND ATHEROSCLEROSIS by *L A Kat M D J m ab St ml M D d Ruth P k M D* 146 p g ll t t d L & F b g Ph l d lph P 1958 P c $5

The authors begin with the p mise that therosclerosis a meta bolic dise se in which altered cholesterol l p d lipoprote n met bo lism plays a c t cal and dec sive b t not exclusi e rol Athero g n c lterations they believe are the co eque ces of a life pan dietary p ttern and esult fr m th ingestion of an hab tually un b l nced diet exce sive in total calo ies tot l f ts saturat d fats and cholesterol and inadequ te in certain e sential n trient particularly es ential f tty acids nd amin acids To support the e conc pts the authors us three m jor inv tigative appro ches to the problem In the ep demiolog c approach they review the ex tensi e studies that have been carried out proving the rel tionship between d et and therosclerос s They contr st the low incidence f cor nary heart disease in eco omically underdeveloped countries and d count any ethnic o racial immunity to atheroscler sis In the nim l exper mental app oach to the os lerosi the authors stat that hypercholesterolemia and atheroscle os s has now been produced in all major laboratory an mals by giv ng h gh chol sterol h gh-fat d ets over n e tended period They po nt out that athero-sclerotic plaques produced e per ment lly in a imals fed atherogenic diets can be r versed by substituting low fat low chol st rol feed ngs In the sect on on the cl n cal patholo ic ppro ch to athero-scle os s the uthors discus the controversi l de s on the mech ism of action f un turated v getable and marine oils in red cing serum cholest ol level They e of the opi on that none of the curr nt expl n tions re wholly cc ptable The final ch pter of th book deal with defin t v approach to th prophylaxi nd ther py of th r s ler sis and s temp red with sound j dgment and comm n e se Th book is highly r commended to ll cl nicians an tho t t e well w tt conc se treati s the nutr tional pe t of ath e o cl o s —*EMMETT L KEHOE C I MC USA*

UROLOGY IN GENERAL PRACTICE by *Frank Coleman Hamm* M D M S F A C S *Sidney R Weinberg* M D F A C S 793 pages illustrated J B Lippincott Company Philadelphia Pa 1958 Price $6

This book has been used by the authors in the teaching of urology at the University of the State of New York It is a paperbacked volume and is profusely illustrated with photographs and schematic drawings It contains an excellent bibliography Inasmuch as this book is intended for use in teaching basic urology, the authors have omitted controversial points unlikely theories and detailed descriptions of major procedures such as are usually found in standard texts on this subject However they have described in adequate detail including illustrations when indicated all of the aspects of urology especially diagnostic procedures The authors have also included an excellent chapter on the roentgenologic aspects of urology with descriptions of the various procedures employed as well as photographic reproductions of typical roentgenograms of normal structures and pathologic conditions This book will be of value to physicians without specialized urological training in the management of patients with actual or suspected urological disease and defects particularly in the performance of simple diagnostic and minor surgical procedures It is also recommended for all students including those at the resident level

—MARK S CURTIS *Capt MC USN*

APPLIED MEDICAL LIBRARY PRACTICE by *Thomas E Keys* A B M A with chapters by *Catherine Kennedy* B S L S and *Ruth M Tews* B S L S 495 pages Charles C Thomas Publisher Springfield Ill 1958 Price $10 75

This book by the distinguished medical librarian of the Mayo Clinic who is also immediate past president of the Medical Library Association contains both more and less than the average physician cares to know or needs to know about medical bibliography Less in that only about the first hundred pages bear out the pragmatic promise of the title and of these only half deal with such matters as the use of medical indexes and abstract publications and the fundamentals of bibliographic description and all this rather cursorily More in that the remainder of the book covers such diverse matters as medical library administration brief descriptions of representative" medical libraries in the United States histories of medical publishing and rosters of notable private medical libraries antiquarian book dealers works available in facsimile editions and the like The primary appeal of this book is likely to be to medical librarians members of medical library committees medical bibliophiles and medical historians in that order

—FRANK B ROGERS *Lt Col MC USA*

BACTERIAL AND MYCOTIC INFECTIONS OF MAN edited by *Rene J Dubos* Ph D The Rockefeller Institute Thirty six contributors 3d edition 820 pages illustrated J B Lippincott Company Philadelphia Pa 1958 Price $8 50

The primary value of this volume lies in the exposition of the fundamental processes of infection and the rationale of control The editor has contributed a thought provoking chapter on the evolution and

haps the major criticism c ncerns the organiz tion and readability of som of those chapte particularly those d voted to the b sic science I ere findings of various r search reports are i en with little o no comment upon their validity or significance It is un common f r the average clinician to be sufficiently familiar with methodol gy and terminolo_y of the newer technics in neur phys iol y neuroch mistry nd neuroph rmacology so th t he can obtain useful nformati n from meager reporting in those fi lds Most helpful were those chapters where the reviewer made sp cial eff rts to integ te and org nize the m teri l w th his own comment and evaluation De spite these shortcomings the book is recommended for neurolog sts nd psychiat ists for it cont ins a wealth of information releva t to their major area f intere t Ho ev r they should expect to devote c nsider ble t me in caref lly perusing its conte ts

—*ALBERT J GLASS C I MC USA*

NUTRITION AND ATHEROSCLEROSIS by *L A K t M D J mi h St ml M D d Ruth P ck M D* 146 p g Il t t d L & F b g Ph l d lph P 1958 P $5

The author beg n with the prem se that athe oscleros is a met bolic di e se in which altered cholesterol lipid lipop otein met b lism pl ys c it cal d decisive b t not exclusive r le Atherogenic lte ations they bel ve are the conseq ences of a life span dietary pattern d result from th in_esti n f an h bitually un balanced diet excessive in t t l calories total fats s turat d fat and chole terol and inadequ te n certain essential trie t p rticularly es enti l fatty acids nd amino cids To support these conc pts the author use three m jor i v stigati e ppro che to the p oblem In the epidem ologic approach they revi w the ex tensiv studies th t have been carr ed out proving the relat onship between diet and therosclerosis They contrast the low incidence of coronary heart disease in economically underdevel ped countrie and di c unt any ethnic or racial mmun ty to therosclerosis In the a imal experiment l pproach to thero cle sis the authors tate th t hypercholesterolemia and atheroscl r sis has now been produced in all major laboratory animals by givi g high-cholesterol high-fat d ets ov r an extended period They point out that atherosclerot c plaq es produced experiment lly in a imals fed atherogenic di ts can be rever ed by sub t t ting l w fat low choleste ol feed ings In the secti n on the clin cal patholo ic approach to atheroscleros the uthors disc ss the controversi l ideas n the mech ani m of ct on of un atur t d vegetable and mar n oils in reducing se um cholesterol levels They are of the op nion th t no e of the urrent expl nat o s a e wholly acc pt ble The final chapter of the book deals w th a d finitive pproach to the prophylaxi nd therapy of thero clero is and s temp ted with sound judgment nd omm n s ns The bo k i h ghly r commended to all cli icians an tho t t e well written conc e treatise in the n tritional a pe ts f th o cl rosis —*E LICTT L KEHOE C I \C USA*

who present the medical surgical psychiatric geriatric dental nutritional requirements genetics and nursing care of the aged as well as social economic and rehabilitation problems In addition there is a useful chapter with information on organizations and services available in this country The preface emphasizes that this book is addressed primarily to the physician as he begins to realize that he is philosopher and friend The emotional problems and communication between older people and persons in the prime of life are discussed but more importantly what can be done to help these patients overcome their emphasized This book is recommended to all physicians whether general practitioner or specialist who recognize the importance of elder patients and their special problems

—JULIUS J WEISSKOPF Lt Col MC USA

TREATMENT OF CANCER AND ALLIED DISEASES Volume I Edited by George T Pack MD F.A.C.S and Irving M Ariel MD F.A.C.S 2d edition Fifty-five authors 676 pages illustrated Paul B Hoeber Inc Medical Book Department of Harper & Brothers New York 1958 Price $22 50

In this second edition of a well known book the editors have laid the cornerstone for a planned series of nine volumes devoted exclusively to the clinical aspects of cancer and its management If the forthcoming volumes exhibit the meticulous attention to detail shown in the first of the series this monumental undertaking will easily become the best reference work available in the huge and complex field of cancer diagnosis and therapy The current volume attempts to present certain principles of treatment as they apply to cancer of any type or body region The chapters proceed logically from cancer prevention and organization of cancer detection facilities to the pathologic grading of cancer and on to principles of management including surgery ionizing radiation and hormonal and chemotherapy In the sections on therapy the editors depart from their intention of presenting principles only for they have accumulated an astounding amount of detail describing the "how" the when" and the "why" This is especially true of the sections on radiation therapeutics The inclusion of such detail enhances the value of this volume for most physicians who can now by reference to appropriate sections map a detailed and logical course of procedure in the clinical management of their cancer patients One of the best chapters in a well written book is the one devoted to preoperative and postoperative care It is simply phrased, concise and enhanced by tables of outstanding value to the text On the other hand one wonders why the chapter on electrosurgical treatment with its emphasis on technical detail of types of currents used was incorporated into this volume This book is a must as a reference volume for all physicians who practice the diagnosis and treatment of malignant disease

—H HASKELL ZIPERMAN Lt Col MC USA

ORAL ROENTGENOGRAPHIC DIAGNOSIS by Edward C Stafne DDS F A C D 303 pages Illustrated W B Saunders Company Philadelphia Pa 1958 Price $14 50

As the author predicts this volume will be of particular dentists especially those who choose oral roentgenology as a

A rare advant ge to the reader stems from the author s association with a medical clinic frequented by many patients suffering from systemic diseases One ch pter of 50 pages w th a b bliography of 65 references is devoted to the dental man festations of some systemic d seases Nearly every co d tion which can be demonstrated radiographically is adequately covered in this volume The discussion of each pathologic condition s opened by a descriptive definition The etiology (occa s onally genetic) pathology and sometimes treatment are provided in a thorough and easy to re d tre tise

The volume i profusely illustrated Each illustr tion is fully eluci dated by the explanatory lines and the text Every dentist should have this volume in his professional library An occasional review may le sen the diagno tic error common to all of us upon routine examina tion of dent l roentgenogr ms —*HAROLD E DILLEY C I USAF (DC)*

ELECTROLYTE CHANGES IN SURGERY by *K thl en E R b t* M D *P k V am* M D *J W ll m P pp ll* M D 113 p g Ch l C Th m Publ h Sp gf ld Ill 1958 Pr c $4 50

In this small vol me written by em nent internists based on clinical experience with many surgical patient ba ic phy iology is presented in rel tion to cert in clinical conditions occurring before d ri g and aft r operat on Some of the practic l subjects di cus ed include electrolyte change occurring pr oper tively s a re ult of bow l p ep ar tion diarrhea and chronic illness a useful method of e tim ting whether blood volume h s been restored when labor tory facilitie for blood volume determ nations are not available complicat ns ar s ng with the u e of massiv blood transf s ons postoperative ch nges in w ter and electrolytes alterations in the acid base balance in surg cal pat ents (a conc se table of differenti l diagnosi of metabolic and respiratory acidosis and lkalo i and metabolic situ tions with pul monary insuffic ency) complicat of removal of gastric or intestinal segments (the physiology and suggest ons for treatment of the dumping syndrome is presented) hepatic f ilure asc tes and edema and the role of elevated blood ammonia mech ni m of et iology and the treat ment of patients with acute and chronic renal d sease ureter sigmoidos tomy and acute ren l hutdown In g neral this i n e cepti nally good practical and up-to date handbook for th d agn sis and treatment of the problems ncountered in lectr lyte changes in surgery

—*PHILIP A COX LI C I USAF (MC)*

ATLAS OF TECHNICS IN SURGERY by *J h L M dd* M D F A C S w th 62 tr b t g uth 648 p g ll tr t d Appl t -C ury Cr ft I N w York N Y 1958 Pr $30

This volume presents most adequ tely the a thor s primary aim of presenting in be utiful detail his technic in a large variety of proce dures usu lly co sidered to be in the domain of the general urgeon by means of drawings by the medical artist Alfred Feinberg Each pro-cedure is discussed by a qualified expert to help balance *in the reader s* mind the many accepted variations in technic of the procedure *under* discu ion The embryo surg on develops through many mod lities of learn g but cert inly the v su lizat n of a urg cal techn c through the

pen of an artist thoroughly mastered by an experienced mature surgeon is no less of these highly disciplined modalities The author does not attempt to develop a complete format for procedures of the neck chest or abdomen but is interested in presenting those technics with which he has had personal experience and would be of sufficient importance to the trained practicing general surgeon as well as the younger man I believe this volume will prove to be a frequent source of reference for a concise rapid review of procedures infrequently performed. The layout of the explanatory text on a facing page to the drawings is most acceptable to the reader There is no lost effort in following the successive sketches of each technic This volume is highly recommended for the surgeon s reference shelf

—DAVID GOLD Col USAF (MC)

TREATMENT OF BREAST TUMORS by *Robert S Pollack* M D F A C S 147 pages illustrated Lea & Febiger Philadelphia Pa 1958 Price $6

This book fulfills a great need to consolidate in one handy volume information on the classification pathology diagnosis and treatment of benign and malignant tumors of the breast It is brief and to the point It includes a comprehensive yet simple classification of tumors together with excellent photomicrographs and gross illustrations of some of the lesions Practical points such as breast biopsy draining sinuses chronic cystic mastitis and breast incisions are also discussed There are clear illustrations of the surgical technic of radical mastectomy to include resection of the internal mammary lymph nodes There is a discussion of the controversy concerning radical versus simple mastectomy with the sound recommendation that up to the present time radical mastectomy offers the best chance of cure There are chapters on radiotherapy oophorectomy hormone therapy hypophysectomy and adrenalectomy The latter includes a description of the surgical technic In general this is a practical volume which would be most useful in the library of every surgeon who treats tumors of the breast If there is a criticism of the book it would be that some readers will yearn for a little more detail and discussion from the author who presents his subject so clearly and practically

—ROBERT M HARDAWAY III Lt Col MC USA

PEDIATRIC CLINICS OF NORTH AMERICA Symposium on Pediatric Cardiology November 1958 *Alexander S Nadas* M D Consulting Editor 1234 pages illustrated W B Saunders Co Philadelphia Pa 1958 Price $15 per year of 4 books issued quarterly

This is a symposium by various authors on pediatric cardiology and an index (1956-1958) to the *Pediatric Clinics of North America* The volume includes four chapters on diagnosis five chapters on the clinical profile or clinical physiologic correlation and four chapters on treatment in pediatric cardiology This symposium is well illustrated by photographs and reproductions of electrocardiograms phonocardiograms and roentgenograms The section on auscultation of the heart discusses various physiologic and pathologic heart sounds in detail with explanations of their etiology and significance The monograph on

electrocardiography deal with this subject in general plus those ECG asp cts peculiar to inf nts and children The electrocardi graphic fea tures of var ous congenital heart malformations are d scussed in detail There is a chapter on cardiac catheterization giving techn c in particu lar plus various b ochemical measurements and a discussion of angio cardiography The morbidity and mortality of cardiac catheterization is also covered One portion of this book deals with cine cardio angiogr phy a method f combining cardiac c theterization with the injection of multiple m ll do es of contrast media into any heart cham ber or into the gre t ve els The fluoroscopic image during these procedures may be tran mitted by a telev sion system and may be per manently record d by motion picture photography A valuable monograph provides clin cal phy iologic cor elation n the diagno is of congenital heart disease The clinic l features of ca d ac differential diagnosis are particularly tressed There is a mo ogr ph on heart di e e in the newborn a d a ch pter on the use of hypothermia in pediatric cardiac surgery The diagnosis and surg cal therapy of transposition of the great vessels s well covered The f nal two ch pters d al with the ma agement of cardiac failur nd rheumatic fever in infa ts and chil dren Thi book is recommend d for all students of pediatrics intern l m dicine and card ology It is n excellent review and refresher for thos who have c mplet d their formal tra ni g in these bjects The volume represe t very readabl ummary of pr ent day aspects of pediatric c rd logy —*BYRON A NICHOL C I MC USA*

CARDIOVASCULAR SOUND IN HEALTH AND DISEASE by *V t A M K k* M D 570 p g ll t t d Th W ll m & W lk C mp y B lt m Md 1958 P $15

This is the most complete monogr ph known to the r viewer on the subject of cardiov scul r sounds and auscultation of the heart Although prim rily a monograph on th s subj ct it i in m ny respects a textbook of cardiology The discussion of the bas c considerations of au culta tory sound includes their physical and physiolog c interrelat onsh ps wher ver the pre ent state of knowledge mak s this correl tion possi ble Detailed descr ptions and interpretations are given of the var ous uscultat ry findings encountered by the clinician and the so c lled normal sound v ri tions murmurs of all types and cause norm l and abnormal auscultatory sounds as ociated with and caused from disease f the pericardium disease of the myocardi m hyperten ion and p eu mothorax Spectral phonocard ograms s pplem nt thi mat rial through out the book As the thor indicates the golden age of uscult tion began to wane some years ago w th the event of x ray catheter z tion and angiocardiography H wever as all tho ghtful pract t ners know there still remain many things to be learned from the caref l examina tion of the heart by auscult tion For interesting relaxed re ding the book will ppe l to all phys cians As a comprehensive ref rence on normal and abnormal c rdiovascul r sounds their genesis a d signifi canc it is complete a d thorough As a bibliography on the s bject of card ova cular s und n h lth and dise se the reader will f nd Dr M Kus k work i w thout p r —*FRANK L BAUER C I MC USA*

MANAGEMENT OF COMPLICATIONS IN EYE SURGERY Avoidance of Pit falls and Treatment of Difficult Situations in Ophthalmologic Oper ations edited by *R M Fasanella* M D 422 pages illustrated W B Saunders Co Philadelphia Pa 195- Price $1-

This book is a compendium of material of 20 distinguished physicians in the United States 18 of whom are ophthalmic surgeons The other two specialties represented are radiology and internal medicine Each member of this group has contributed a chapter which when combined and edited by Dr Fasanella an ophthalmologist becomes a most authoritative and straightforward book on eye surgery and its complications The objective of this book is to point out pitfalls and complications in eye surgery Particular emphasis is placed on the pitfalls and their avoidance as a true basis for preventing complications in eye surgery Individual chapters deal with complications in the realm of anesthesia medicine psychiatry and radiation others discuss the complications of the subspecialties in ophthalmology such as intraocular foreign bodies ptosis trauma keratoplasty glaucoma cataracts retinal detachments orbital surgery plastic surgery of the adnexa and extra ocular muscle surgery The chapters Endocrine Exophthalmos Estimation of Loss of Visual Efficiency and Re habilitation of the Low Vision Patient are of particular importance to ophthalmic surgeons because of the ever increasing pension con sciousness that exists in our society One of the outstanding things about this book is its forward look Obsolete technics and material are omitted and emphasis is placed on new sound surgical technics The book is well illustrated by many drawings and reproductions of x rays and photographs The bibliography is excellent This book is enthusiastically recommended to all residents in ophthalmology oph thalmic surgeons as well as other physicians who perform surgery on the ocular adnexa or orbit —*AUSTIN LOWREY J Col MC USA*

CLINICAL OBSTETRICS AND GYNECOLOGY Volume 1 Number 3 S ptem ber 1958 A quarterly book ser es Symposium on Special Diagno tic Aids edited by *C Paul Hodgkin o* M D and Symposium on Abnormal Uterine Bleeding edited by *John L B ewer* M D 852 page illustrated Paul B Hoebe Inc Medical Book D partment of H rper & B others New York N Y 1958 Pri e $18 for four con secutive numbe s

This book is the third of the quarterly offerings of a new publication of two parts the first *Special Diagnostic Aids* was edited by C Paul Hodgkinson and the second *Abnormal Uterine Bleeding* by John L Brewer The contributors are 46 noted authorities in obstetrics and gynecology representing medical centers all over the UnitedStates The first impression made on this reviewer by the concept of this book series was that it might serve a useful purpose in medical litera ture Every few year the broad field of obstetrics or gynecology could be thoroughly and concisely reviewed to bring the busy practitioner of this specialty up to date The subjects are broad in scope as well as their coverage This proved to be *perhaps* the downfall of this issue in fulfilling the potential promise of wrapping this up completely

throughout t was found to be superficial in its tr tment of the dia, nostic aids and the var ous causes of ut rin bleeding This criticism raises the question of for whom this quart rly series is intended If it is intended for the pec alist in the f ld it missed its mark If this issue is representative of the series then it w uld seem to have a definite value for the medical student and ntern group In l terature designed for the specialist this reviewer fe ls compelled to make a ple for better quality ather than *p* eat r q antity

J WILSON HUSTON Capt MC USN

THE YEAR BOOK OF GENERAL SURGERY (1958 1959 Y B k S t)
d t d by *M cb l E D B k y* B S M D M S w th ct
A th s d d by *St t C. C H* M D 588 p g ll s-
t t d Th Y B k P bl h I Ch g Ill 1958 P
$7 50

This book which contains abst acts of the articl s the editor con siders of m t significa ce in the surgical literature dur ng the past year continues the f ne pe formance of its pr d cessors Cardio-v cular surgery occupies an increasing percent ge of the pages which is consistent w th the dyn m c progr s show nd the interest of m ny surg ons in this pioneering field The comments of Dr De Bakey emphasize the divergenc of opinion which exi ts in many a pects of this field The sections o tissue t an plantation and nutritional man gement probl m are excellent s is th t de oted to clin cal a d physiol gic a pects of the stom ch and d odenum The section on anesthesi contains an excellent r view of ventil ation fo the general surgeon Recent ad ances i this spec lty and newer anesth tic agents are rev ewed critically This ann l summary of the surgical liter ture should be in every surge n s library It pro vides a y r by year esum of the de elopm nt n a y part cular p oblem its references constitute an excellent starting point for a more exha stive search of the l terature and its abstr ct point o t important contributions one m y have m ssed n the complete article

—DAVID E THOMAS Lt C l MC USA

THE YEAR BOOK OF RADIOLOGY (1958 1959 Y B k S) R d I g
D g d t d by *J h Fl yd H lt* M D d *F d J H dg*
M D R d Th py d d by *H ld W J* M D d M *t*
M Kl g m M D 448 p g ll t d Th Y B k P bl h
I Ch g Ill 1958 P $10

The new *Y a Book of Radiology* follows the best tradit o s f ts pr decesso s in clear and compact coverage of many w ll s lected art cle f om the rece t e tensi e radiological lit ature A such t sh ld h e a w de ppeal not only to adiologist but also to pr c-t t toner n other fields of m d c ne since the adiolog cal and the cl n l fe tures of many diseases a e i tim tely intertwin d As i p e yea the u rent olume is divided into two m jor selec t on am ly (1) r d olog al d gnos s nd (2) r diation therapy Sel t d rti l ea h re classifi d ccord g to body syst ms l dd o d d t on th py the e e sub ections of rad atio

throughout it was f und to be superficial in its treatment of the diag nostic aids and the various causes of uterine bleeding This criticism raises the question of for whom thi quarterly series is intended If it is intended for the specialist in th f eld it missed its mark If this issue is representative of the series then t would seem to ha e a definite value for the medical student and intern group In l terature des gned for the speci list this reviewer feels compelled to m ke a plea for better quality rather than greater quantity

J WILSON HUSTON Capt MC USN

THE YEAR BOOK OF GENERAL SURGERY (1958 1959 Y B k S)
d t d by *M b l E D B k y* B S M D M S w th t
A th d t d by *St a t C. C H* M D 588 p g ll
tr t d Th Y B k P bl h I Ch g Ill 1958 P c
$7 50

This book which contains abstracts of the rticles the editor c n siders of most significance i th surgical l terature during the past year continues the fine perform nce of its predecessors Cardio-vascul r surgery occupies an ncre s ng perc ntage of the pages wh ch is consistent with the dynamic prog ess shown and the interest of many surgeons in this pioneering field The comments f Dr De Bak y emph ze the divergence of opinion which exists in many aspects of this field The section on tissue transplantat on and n tritional m n g m t problems re excellent a is th t dev ted to cl nical and phy olog c a p cts of th tom ch and duodenum The section on an the a o t ns an exc llent review of ve til t n fo the gener l rgeon P ent dvances in this pec lty d newer anesthetic agents are reviewed critically This annu l s mmary of the surgical literature should b in every surgeon s library It pr vides a year-by year r sume f the devel pm ts in any pa ticul problem its references const tute an excellent starting point fo more exhaustive search of the liter ture nd its abstracts point o t importa t contributio one m y have m ssed in the complete articl

—DAVID E THOMAS Lt C l MC USA

THE YEAR BOOK OF RADIOLOGY (1958 1959 Y B k S n y R d l g
D g d t d by *J h Fl yd H lt* M D d *F d J H dg*
M D R d t Th py d d by *H ld W J* M. D d W *t*
M Kl g m M D 448 p g ll t d Th Y r B k P bl h
I Ch c g Ill 1958 P $10

The new *Yea Book of Radiology* follows the best tradition f its predecessors in clear and compact coverage of many well selected articl f om the recent extens ve r diolog cal liter t re As such it should ha e a wide appe l not o ly to r diologists but also to pr c titi ne s n other fields of medicine since th rad ological and the l n cal fe tur s of many dise e are intimately int rtwined As in p e yea s the current volume is div ded into two major selec t ns amely (1) r diologi al d agnosis a d (2) radiation therapy S l t l rt le each te cla s fi d according to body systems In add t n der r d t on th py the are subsect ons of rad tion

In this issue

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The future of

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CLINICAL HOLOGIC CONFERENCE CASE REPORTS

UNITED STATES ARMED FORCE

Medical Journal



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May 1959

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Quarterly Cumulative Index Medicus
(American Medical Association) Author and subject

INSTRUCTIONS FOR AUTHORS

(See second of front cover)

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THE DIRECTOR OF THE BUREAU OF THE BUDGET 10 FEB 1959

Monthly Message

The Department of Defense has established an Emergency Medical Care Program and directed prompt accomplishment of certain limited objectives The primary go l of the program is to develop the in being milit ry medical resources required for the essential support of the armed forces during the emergency disa ter ph se following a thermo nuclear attack and post attack rehabilitation The policy is to provide medical support required to m int in the g eatest number of m litary personnel on active duty under cond tions imposed by major attack t eatment of casu lties and post attack medic l c re of the surviving m litary population

Phase I includes a large carton of 23 item selected by a joint pro fessional staff of the three med cal departments there are sufficient supplies to provide austere self or buddy c re for 100 people for 72 hours These are em rgency fir t id items designed to furnish care until the casualties can be evacuated or transferred to facilities u der physici n supervision for m ximum recovery in support of the military miss on In this pack ar nine distinctly m rked boxes of convenient weight and size for one man carry To accomplish effectively the objective for wh ch these units ar designed maximum dispersal must be ttained and the packs located adjacent to quarters and work sites The dispersal r quires funding both retail stock fund nd app op iated funds Initial shipment of the complete p cks should commence during the current f scal year

Plans are in process to ensure that all pers nel are not only aware of the program but also famili r with the tems and the effect ve use thereof Training t the pre ent t me is given to all enli ted personnel of the three services and it also is hoped that *all* officers will u der st nd the use of the emergency packs so th t they m y lead nd direct in knowledgeable fashion

Ph se II attack casualty medical care w ll be given to c u lties primarily by nonprofessional medical personnel under p ofession l sup rvision This treatment is more extensive than Phase I care as the casualty will be in medical ch nnels Materiel n support of Phase II will be directed to and stored adj cent to medical units and will be rotated through the utiliz tion of peacetime usage It is contem- pl ted that part of the Phase II materiel requirement w ll be filled during the current year

Phase III the definiti e care nd Phase IV which consists of deter- min ng milit ry medical req ements (ma power fac lities materiel nd services) obt ined from the surviving nation l economy are in th pla ning stages

Frank B Berry

FRANK B BERRY M D
A ist nt Secretary of Defen e
(Health a d Med cal)

UNITED STATES ARMED FORCES MEDICAL JOURNAL

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Monthly Message

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(Health and Medical)

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FRANK B BERRY M D
A t t Secr t ry of D f (H lth d M d l).

MAJOR GENERAL SILAS B HAYS
S g G l U t d St t Army

REAR ADMIRAL BARTHOLOMEW W HOGAN
Surg G l, U t d St t Navy

MAJOR GENERAL OLIVER K NIESS
S g G l U t d St t A F c

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RADIATION HAZARDS ABOARD A GUIDED MISSILE CRUISER

WALTER JOHNSON *Lieutenant MC USNR*
VICTOR H KINDSVATTER *Commander MSC USNR*
CHRISTOPHER C SHAW *Captain MC USN*

THE presence of high energy radar apparatus on vessels equipped with guided missiles has added new and pressing problems in preventive medicine aboard ship of direct concern to the medical officer Recognition and solution of such specific problems requires familiarity with the physical aspects technics of measurement, and biological effects of microwave (radar) and ionizing (x ray) radiations This article is presented as a summary of basic information and practical experience both ashore and afloat to enable the ship s medical officer to understand the problems and to ensure that proper measures are taken to protect his crew against the potential hazards of radiation such as were encountered aboard the U S S *Galveston*

SHIPBOARD RADIATION PROBLEMS

The U S S *Galveston* is the third ship in the United States Navy armed with guided missiles and the first such light cruiser in the world equipped with the Talos weapons system which directs guided missiles to the target by high powered radar beams She was commissioned at this shipyard on 28 May 1958 (fig 1) In addition to multiple radar transmitters of various power for tactical purposes mounted throughout the length of the superstructure this ship is unique because she carries two WX SPG 49 radar fire control transmitters for offense mounted on the afterpart of the superstructure Each such radar has two components (1) an "acquisition beam to scan the sky and locate the target and (2) a "tracking beam to lock on target and track

From the Medical Department U S Naval Shipyard Philadelphia Pa

Foreword

Th U t d St t Arm d F M d l J urn l t th med um f dt
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m d l p o l f th D partm t f D f e Th A t t Se ta y
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FRANK B BERRY M D
A t t S cr t ry f D f (H lth a d M d l)

MAJOR GENERAL SILAS B HAYS
S g G l U t d St t Army

REAR ADMIRAL BARTHOLOMEW W HOGAN
S g G l, U t d St t N vy

MAJOR GENERAL OLIVER K NIESS
S g G l U t d St t A F

MICROWAVE RADIATION

It is well known that in experimental animals, microwave radiation associated with radar beams of high intensity can cause cataract formation, corneal opacity, or testicular degeneration, and in sufficient intensity may be lethal However, this may not necessarily apply to the human "animal " Nevertheless, on the basis of existing information the level of 0 01 watts/cm² (10 milliwatts per square centimeter of body surface) has been arbitrarily established as the maximum safe level of microwave radiation for human beings for indefinite periods of time [1] Higher values are considered hazardous

Accordingly, in an attempt to establish safe distances from the AN/SPG 49 radar antennas under varying conditions of operation, measurements of the radio frequency field density were made on 14 March 1958 on the *Galveston* using a new portable radio frequency power density meter known as a "microline radiometer," Model 647 is produced as a research instrument by the Sperry Gyroscope Company The distance at which the intensity of the radar beams under the various possible operating conditions reached 10 milliwatts/cm² was determined, using this radiometer with the results shown in table 1

TABLE 1 *Distances for 10 mw/cm²*

Condition	Measured result (feet)
One track beam	92
Two track beams	130
One acquisition beam	162
Two acquisition beams	230
All on simultaneously	265

Calculated distance (Difference of 90° in polarization of the radar beams permits measurement of the individual beam intensity of the radio-frequency field from the combined simultaneously)

These measurements were made in the center of the beam, with all four beams directed at the same point either individually or simultaneously

The beam angle of the ray from these radars is approximately plus or minus 1 , and the intensity falls off rapidly as the measuring apparatus is moved away from the center of the beam Accordingly no detectable radio frequency radiation was found on the fantail when both radars were directed at the ship s bore sight tower above it

The area behind the radar lens adjacent to the AN/SPC 49 radar was below any readable value A maximal value of 5 mw/cm was found immediately adjacent to the acquisition screen The entire area about the radar apparatus does not show any radio frequency power density in excess of 10 mw/cm except directly in front of the lens thus ruling out significant side lobe effect

During sea trials early in 1958 conducted by the Naval Board of Inspection and Survey before acceptance of a ship as an operating unit of the fleet additional measurement were made using the microline radiometer No detectable radio frequency radiation was encountered on the signal bridge of the ship located on the forward part of the superstructure when the uppermost AN/SPG 49 beam was pointed directly at it with the acquisition and tracking beams both on full However the afterpart of the superstructure was found to have levels of microwave radiation in excess of 10 mw/cm when the uppermost of the two AN/SPG 49 antennas was pointed directly at the measuring area with only the acquisition beam energized In addition the entire fantail of the ship was found to have levels of radiation in excess of 10 mw/cm when the AN/SPG 49 antennas were both energized on acquisition and track and depressed at an angle of approximately 7 to the horizon so that they pointed directly at the deck of the fantail No radiation was detectable however when both AN/SPC 49 antennas were energized on track and acquisition but were pointed at the boresight tower located on the fantail

It is apparent from these measurements that certain portions of the after section of the *Calveston* are potentially dangerous when the AN/SPC 49 radar transmitters are pointed directly at them Personnel therefore are not allowed in such areas during activation of the equipment Under normal operating conditions no general quarters station aboard this ship is exposed to levels of microwave radiation in excess of 10 mw/cm

While measurements were being taken of the radar beam intensity aboard this cruiser each investigator wearing copper mesh goggles to protect the eyes against overabsorption it was found that neon lamps will light up if held in these radar beams when the intensity is approximately 5 or 6 mw/cm and thus well within the safety range Therefore as a ready means of detecting intense levels of radiation crew members working in the area of the radar transmitters have installed small neon lamps (series NE 1 standard U S Navy stock) inside their caps Whenever the [illegible] the level of radiation may be excessive they simply take off their caps and look at the bulbs if they are lit the men immediately remove themselves from the area Ordinary photographic film is also far even more sensitive to radar beam and were found [illegible] at a level of approximately 1 or mw

cm² These makeshift detection devices can be quite useful under circumstances where men are occasionally required to enter areas of potentially excessive microwave radiation

To date there has been no known overexposure of personnel to microwave radiation on the U S S *Galveston* and none of the men have reported with signs or symptoms which can be ascribed in any way to effects of high frequency radar

Because the biological effects of microwave radiation[2] have not been described as extensively as those of ionizing radiation (caused by x rays, alpha and beta particles, gamma rays, neutrons and cosmic rays), a short résumé of the action of very high frequency radar beams on living tissue is presented

BIOLOGICAL EFFECTS OF MICROWAVE RADIATION

Microwave radiation is non ionizing in character Nonionizing radiation is produced by that portion of the electromagnetic spectrum with a frequency lower than x rays *e g* television, radar beams, infrared, visible and ultraviolet light (fig 2) Radiation in this frequency range exerts its influence on matter by creating heat by means of a dielectric effect Atoms and molecules having asymmetric electrical charges undergo rapid rotation in an alternating electrical field This dielectric effect" is characteristic of electromagnetic (microwave) radiation which biologically, apparently results only in the production of heat

Under normal circumstances heat generated in the deep tissues of the body is transferred by the circulating blood to the skin where it is dissipated into the environment Equilibrium of the body temperature as a whole is established when the rate of heat dissipation equals the rate of heat production The temperature at which this occurs is a function not only of the intensity of incident radiation but also of the capacity of the body to dissipate heat The existing biological condition therefore, is influenced to some extent by the environmental temperature relative humidity and rate of circulation of air

Certain parts of the body because of relatively poor vascular supply are not well equipped locally for the dissipation of heat and therefore, sustain greater temperature increments than the body as a whole when exposed to microwave radiation In addition local collection of fluids for example, within the lumen of the gut or bladder and the aqueous and vitreous humors, cannot dissipate heat as readily as an equal volume of vascularized tissue For these reasons the eyes the gut and the bladder are especially susceptible to damage from excessive dosage of microwave radiation The testicles although well provided for the dissipation of heat have an exceptionally low threshold to thermal damage and therefore also are more readily injured by exposure to microwave radiation

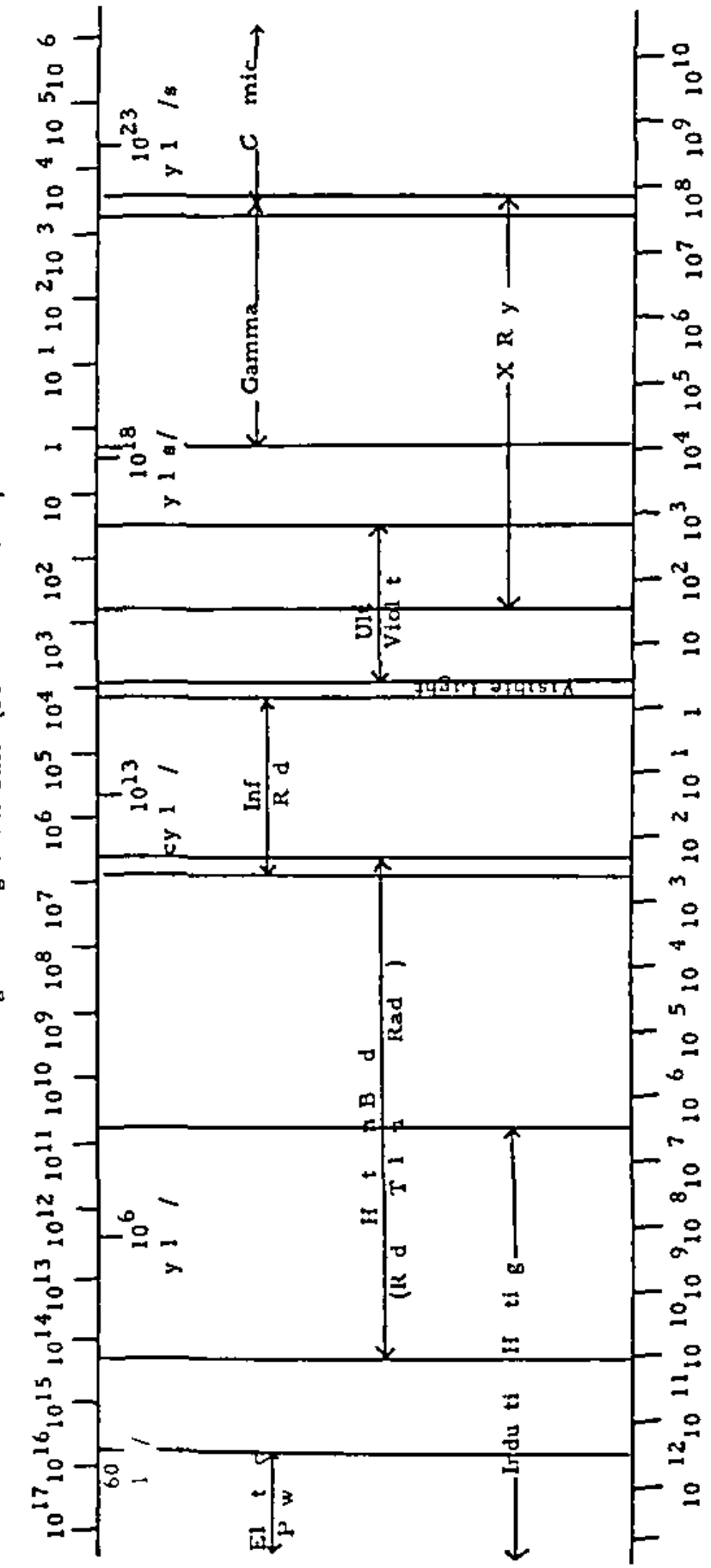


Fig Th l t mag t p t

Experimental work with animals[3] shows that cataracts can be produced in rabbits by several minutes of exposure to power densities in the range of 500 to 600 milliwatts/cm². The threshold of experimental ocular injury for a single sustained exposure of 270 minutes was found to fall between 120 and 220 mw/cm². (The frequency used in these experiments was not stated.) In the same and subsequent experiments, the temperature threshold for cataract production at the posterior lens capsule was determined to be 49 to 50° centigrade. It was recommended that these thresholds be considered hazardous for man, that prolonged exposure to microwaves at a power density of 120 milliwatts/cm², or greater, carried the possible risk of cataract formation. It should be noted that these levels are far in excess of that which can be tolerated by the body as a whole. Parenthetically, ultra high frequency radiation at an intensity of 60 mw/cm² is not cataractogenic in experimental rabbits because it does not produce heating in the region of the lens.[4]

The steady state (*i. e.*, indefinite time) threshold for testicular damage in the rat is only 5 to 10 milliwatts of power density. Again, it is estimated that this threshold should pertain to man's genital area.[1]

In a four year study at the Lockheed Aircraft Corporation, Barron and Baraff[5] compared 226 radar exposed employees to 88 nonexposed "control" subjects. An extensive system and organ inventory of each person was performed at 6 months and at 1 year and 2 year intervals with emphasis on ocular structures, central nervous system, gastrointestinal and urinary tracts, hematopoietic system, and skin. These investigators uncovered no pathologic changes caused by either single or repeated exposures which varied from an occasional incidental contact with the radar beam to as much as four hours daily close exposure for periods up to four years. Exposures of several minutes a day at distances of less than 10 feet from the radar equipment were not uncommon. Protective clothing was not worn while in or near the radar beams energized in the 400 to 9 000 megacycle range and with occasional peak power output exceeding 1 megawatt.

The incidence of death and chronic disease, sick leave, and subjective complaints was comparable in both groups. A high percentage of eye pathology was identified but none with casual relation to the hyperthermia produced by the microwave absorption. Fertility studies revealed essentially the same findings for both groups[5] exposed vs nonexposed employees.

In short, the majority of radars in common use today are relatively low powered and as such do not induce pathologic changes in human beings. In the near future, however, radar beams of much greater power density undoubtedly will become

operational especially in the military services This brings into focus the problem of safe dosage which in the Armed Forces is recommended at not more than 0 01 watt/cm²

A factor of considerable importance in determining safe levels of microwave radiation is the distinction between average and absolute intensity Most radar apparatus operates on a pulsating rather than continuous output For example a specific radar transmitter may use an intermittent signal at a frequency of 1 000 pulses per second each pulse perhaps only one millionth of a second in duration In this case the average intensity of the radiation is only one one thousandth the pulse value The heating effect of this pulsating radiation is determined by the average rather than the absolute intensity Fortunately the usual techniques of measurement determine only the average intensity and therefore the results are directly applicable regardless of whether the apparatus operates on a pulsating or a steady state principle

Be that as it may our radiation problems aboard the guided missile cruiser did not end with differentiation of the safe from the hazardous areas of microwave emanations from the high frequency radars for intercepting and tracking enemy targets Another form of radiation x ray was given off by the klystron tubes within the antenna domes of the AN/SPG 49 radars Radiologic surveys were made by the industrial hygienist (V H K) at the Philadelphia Naval Shipyard before the U S S *Galveston* was commissioned These surveys revealed intensities of x radiation at the immediate rear of the traverse member housing the klystron tubes (with the clamshell open) as high as 10 roentgens per hour This is about thirty times the permissible weekly dose for occupational exposure

Because the presence of these high levels of x ray were not anticipated eight men had had duties in this area during intermittent operation of the equipment for several weeks prior to the measurements Although no record of the time each spent in that area of ionizing radiation is available it was estimated that several individuals may have received exposure for more than one hour thus far exceeding the individual permissible weekly dose of 0 3 roentgens No symptoms of radiation sickness were experienced by any of the men presumably so exposed and to date (six months later) follow up ophthalmological examinations have remained negative for cataracts

When the excessive levels of ionizing radiation were discovered temporary additional lead shielding of the klystrons was installed at once reducing the radiation levels well within the recommended permissible dose rates Eventually the klystron tubes will be replaced with new tubes provided with built in shields which will reduce the ionizing radiation to an absolute minimum Meanwhile the following safety precautions were recommended

1 Traverse members (interior of the "clamshell) to be designated controlled areas in which the occupational exposure of personnel to radiation is under the supervision of a radiation safety officer and appropriately posted under supervision of the ship s radiation safety officer (a Medical Corps officer)

2 Personnel having access to and working in s id controlled areas shall be monitored by film badges or pocket dosimeters during their occupancy

3 Such personnel to receive instruction in safe working practices and periodic physical examinations in compliance with Bureau of Medicine and Surgery Instructions

With the precautions listed above, based on scientific measure ment of the intensity of the microwave radar beams and x rays during actual sea trials of the scanning and tracking instru ments (AN/SPG 49) no hazard to the health and welfare of the ship's company has been encountered and none is anticipated

MEASUREMENT OF MICROWAVE RADIATION

The determination of the intensity (power density) of micro wave radiation requires special equipment not readily available to ships Furthermore an understanding of the technic involved requires a certain degree of familiarity with electronic principles not commonly possessed by medical officers It therefore would be superfluous to discuss the procedure in this article For those interested practical details for the determination of power den sity at microwave frequencies are outlined in reference [8]

It is expected that in the not too distant future portable ap paratus for measuring microwave radiation will be available for routine use in the power density determinations aboard the U S S *Galveston* Meanwhile neon lights will glow when ex posed to microwaves producing approximate energy of 5 or 6 milliwatts per square centimeter Photographer s flashbulbs will fire at 1 or 2 mw/cm^2 As practical safeguards to avoid ex cessive exposure to radar waves they are ideal

SUMMARY

Microwave nonionizing radiation (radar beams) in sufficient intensity can produce testicular damage lenticular and corneal opacities in experimental animals and possibly even death from cooling of viscera by excessive diathermy

Ionizing radiation (x rays) in sufficient intensity will initiate the "acute radiation syndrome" , low doses over long periods of time are cumulative, increase the incidence of malignancy and possibly may shorten the life span or produce undesirable genetic mutations A comparison of the major aspects of ionizing (x ray) and nonionizing (radar) radiation is presented in table 2

Both types of radiation (ionizing and nonionizing) were encountered aboard the *U S S Galveston* at hazardous levels some personnel were inadvertently exposed to presumably excessive doses of x ray prior to commissioning of this vessel but without ill effect then or six months later

TABLE 2 *Comparison of major factors of ionizing (x ray) and nonionizing (radar) radiation*

Factor	X ray (ionizing)	Radio (nonionizing)
Ethiology	Alpha particle Beta particle Neutron X ray Gamma ray Cosmic ray	Microwave (radar) Radio wave Infrared Visible light Ultraviolet
Latent period	Range Range none-quarter century (?)	Without practical significance
Mechanism	Impairment	Destruction Depilation Malignancy
Clinical	Anemia Acute syndrome Prodromal Cerebral Gastrointestinal Hematopoietic Cumulative effect Genetic Shortened life span (?) Leukemia Cancer	Inconsistent Cataract Testicular damage Hypothermia Nervous irritation Hypothyroidism Death
Measurement	Geiger counter Film badge Pocket dosimeter	Microwave detector Neon lamp Photographic flashbulb
Safe dosage	0.05 roentgen/day 0.300 roentgen/week but not 5,000 roentgen/year	0.1 watt/square centimeter (10 milliwatt per square centimeter)

Temporary measures have been taken with complete success to protect the crew from both types of radiation and other more effective measures are proposed for the future Small neon lamps (series NE 51 USN) will glow at 5 to 6 mw/cm² and photographer flashbulbs will "detonate" at 1 to 2 mw/cm of power density Thus they are excellent practical safeguards to prevent overdosage of personnel

The seriousness and irreversibility of overabsorption of both types of radiation, and the usual absence of symptoms at the time of exposure, warrant the most careful precautions and safe guards to give the crew adequate protection from these potential hazards In the last analysis such matters are problems of public health and preventive medicine and are of vital importance to military as well as civilian personnel This entire area is a prime responsibility of the medical officer, both ashore and afloat

ACKNOWLEDGMENT The authors are indebted to Mr Frank Fecher ordnance engineer U S N val Shipyard Philadelphia Pa for technical assistance in preparation of the electronic aspects of this report

REFERENCES

1 Schwan H P a d P rsol G M. Absorptio of l tr magn tic e e gy in b dy t s ues r i w and c t c l an ly is physiol gical and cl nic l spects *Am. J Phys Med.* 34 425 448 Jun 1955

2 K f G M Bi l gic l effect f mi w v d tio n Air F rc p rs l *A M. A Arch Indust Health* 17 48-52 Ja 1958

3 Will ms D B and Fi ott R S S mmary of SAMUSAF pr gr m for r se h o bi m d l sp ct f micr wav radi t n Proc d gs of the Tri Ser c C f re c o Bi l g l H zards of Micr wave Radiati n R me A r De elopme t C nt r N Y July 15 16 1957 Ab t ct d in *U S Navy Med News Ltr* 30 35 Nov 22 1957

4 Cog D G Fr ck r S J Lub M Do ldso D D and H rdy H C t ct and ltr h gh f qu cy r d t o *A M A A ch l du t Health* 18 299-302 Oct 1958

5 Barr n C I and B r ff A A. Medical n id t o of posur t m crow e (r dar) *J A M. A* 168 1194 1199 No 1 1958

6 Do d r R L D t rm t f p w r d n ty t m crow v fr q cie In *Proc edmgs of the Tri Service Conference on Biol g cal Hazards of M cr wave Rad at on* R m Air D l pm nt C t N Y July 15 16 1957

7 M cr w (rad) h lth h ard h lth pr t f pr t n of Bum d N t ce 6260 Bur f M d d Surg ry D p rtm t of th N vy Apr l 1 1958

8 Do d to R L Ab tr t f ref re 5 *U S Navy Med News Lt* 31 22 J 24 1958

9 G t er H B A t l l ff ct of p t ti g cl r d t n *J A M A.* 168 381 388 S pt 27 1958

HEALTHY PARTNERSHIP

I believe the goal of a healthy citizenry is a challenge to all of us in the health profession both in and out of gov ernment It is a challenge that calls for concerted and cooper ative action by all groups that have a stake in better health We in government would like to be a helpful partner in this vast enterprise The results of the years of partnership be tween the government the people and the medical profession are evident in every phase of national health We need only to move forward together to achieve even better health care for the people of this country —Aims C McGuinness The Role of the Federal Government as it Relates to Medicine *Southern Medical Journal* December 1958

ACUTE PSYCHOTIC REACTIONS OCCURRING DURING TRAVEL

DON E FLINN *Lt Col USAF (MC)*
KENNETH R GAARDER *Capt USAF (MC)*
BASIL C SMITH *Lt Col USAF (MC)*

IN the past few years a series of patients who developed transient psychotic episodes while traveling were observed at this hospital Because of certain common clinical features we have referred to the condition as the *travel syndrome* In these cases the psychotic episode is of short duration lasting a few days to two weeks or so and remission is usually complete Of the various psychotic symptoms the most characteristic are paranoid delusions and hallucinations In many cases alcohol was an important causal factor

TRAVEL SYNDROME

In a typical case the symptoms appear after the individual has been traveling several days often to or from an overseas assignment Before his departure he may have drunk more alcohol *than usual at one or more going away parties During the trip* as a rule he drinks no further alcohol but eats irregularly and inadequately with minimal fluid intake Insomnia is common so that fatigue is an added physiologic factor He has no familiar companions and little break in the monotony of traveling The psychotic symptoms appear after two or three days of travel sometimes insidiously but more often explosively The individual s fear and panic or his pleas for protection from some delusionary threat result in his hospitalization often through the hands of the police

Psychologic stresses associated with the trip also contribute to the development of the illness The individual who is traveling to an overseas assignment faces the prospect of new responsibilities while separated from friends and family for a long period The one returning from such an assignment is often concerned with re establishing family relationships some of them previously disturbed and painful For example one of the few patients not traveling alone was bringing his Japanese bride home to meet his parents who had opposed the marriage

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A very few similar cases have been reported Some years ago comparable cases were observed at Letterman Army Hospital[1] The syndrome usually occurred in soldiers who had traveled several days by train Fatigue, alcoholic intake, and inadequate nutrition were often present, as in our cases and the psychotic episode was of brief duration after these factors were corrected Another interesting and somewhat similar series of cases of acute psychotic reactions in military personnel during World War II were observed by Fox[2] who described four cases In each instance the man had come from an isolated Pacific duty station to a large city for a much anticipated furlough Upon arrival the man took a hotel room, began drinking, and indulged in sexual promiscuity In one to three weeks each patient became acutely psychotic Their hallucinations and delusions were frightening and had a *prominent erotic or homosexual component* These patients with "furlough psychosis," as Fox termed it responded promptly and fully to hospitalization and within three weeks each was asymptomatic In parallel cases in Naval personnel the importance of emotional factors associated with transfer was observed by a psychiatrist In what he called the "chief syndrome" a transient psychotic reaction developed during an individual s transfer to another post The syndrome often was seen in a chief petty officer who had attained his rank through wartime exigency but whose qualifications were otherwise marginal Often in his previous billet he had been carried along by associates Transfer raised the disturbing prospect of struggling with a new job among strangers Such men although usually not excessive drinkers would drink heavily before the transfer During the trip an acute psychotic illness would develop just as in our cases of travel syndrome

Over a three year period 22 cases of so called travel syndrome were seen Such a small series hardly warrants a detailed tabulation but a general summary of the clinical manifestations can be made All of the 22 patients exhibited such overt psychotic symptoms as hallucinations, delusions or ideas of reference Thought content was not stereotyped but was colored by the patient s individual conflicts Clinical evidence of dehydration and fatigue were present in varying degree in nearly all patients but routine somatic studies were otherwise normal Most of the patients had a clear sensorium Seven of the patients were heavy habitual drinkers and could probably be classified as chronic alcoholics Of this group, five showed disorientation confusion tremor and fever consistent with delirium tremens Even in these, however, the hallucinations were more prominently auditory than visual and the delusional ideas were fairly well organized and coherent Eleven of the patients were moderate to heavy regular drinkers although they could not be considered chronic alcoholics In the remaining four there was no history of alcoholic intake All but these four had a history of drinking just before starting to travel, although the amount varied widely

Treatment consisted of such measures as correction of fluid deficiencies, sedation insurance of adequate nutrition and vita min supplements Approximately one fourth of the patients re ceived small doses of chlorpromazine hydrochloride Most pa tients were entirely asymptomatic within one week In the four with no history of alcoholic intake recovery was not as prompt or as complete In these, while the overt psychotic symptoms disappeared within three weeks two had only partial insight into the delusional nature of their experiences

CASE REPORTS

Case 1 *A 36-year old officer* was admitted to the hospital after complaining to the police that an OSI colonel was plotting to kill him The patient had just returned by a r to the United States from a tour of duty n the Far East In the two days prior to departure he attended a going away p rty drank heavily and had a brief extra m rital encounter someth g he had not done before A few hours *after departure he beg n to feel that other p ssengers were talking* about him Soon he heard them mak ng dispar ging remarks about his recent behavior and plotting to do him bod ly harm In Hawaii he be- lieved that offici l statements regarding his conduct were gathered from passenge By the tim he reached California he was very fright ened and in a r ilway stat n thought he heard two ilors plotting to kill him He forced his w y into the baggage room and called the police who surveyed the situation and then left When h gain sum- moned the police to compl in about the OSI colonel who he b lieved was going to kill him he was brought to the hospital

On admission he was markedly gitated He thought th t his wife was somewh re in the hospital and expr ssed a great deal of guilt about his recent behavior One of his many paranoid ideas concerned the arrest of 10 000 people in San Francisco alone because they wanted to kill him He wa fully or ented in all spheres and there was no evidence of recent drinking During 10 days on a closed ward he received moderate doses of chlorpromazine hydrochloride He easily g ve up the delusion that his wife was in the hospital after he was allowed to call and talk to her in another state In the f rst few days his apprel ension diminished and the hallucinations and delusions dis ppeared He was completely asymptomatic at the end of 10 days and was returned to duty after a one-month hospitalization

According to the patient s past history he had done better than average work in college and had flown 55 missions dur ng World War II w thout ncident Since th t time he had effectively performed his adm n st t v dut es and his service record was excellent In the past he h d used alcohol regularly but not to a degree th t caused occupat o l mp irment or marital discord He had drunk only in frequently f the l t s x months of his overseas tour until the time of the go g way p rt es

Case 2 A 38 y r- ld d orced airman f st class was returning by bus to the west co t ft two-week l ve at h s home in Boston

In Wyoming on the third day of the trip he began to make up words to the hum of the tires Soon it seemed as if they actually were saying "you gotta go back you gotta go back and next he was convinced his father was speaking to him As the journey continued he thought that carloads of people from his home city were chasing the bus to return him to Boston At the next bus stop the patient accosted several people whom he thought were former friends and neighbors He was then apprehended by the police and hospitalized at a nearby military hospital Records from the hospital indicate that he was confused on admission and had hallucinations and delusions These symptoms cleared rapidly and upon his transfer to this hospital five days later he showed no evidence of disordered thinking He could remember the details of his experience and had good insight

His past history showed a pattern of long standing passivity and compliance He had married at 25 and nine years later had agreed without complaint when his wife refused to join him overseas and asked for a divorce He spoke of her fondly and expressed no resentment about her reported liaison with a man whom she married immediately after the divorce He was always close to his mother and had been affected deeply by her death two years before his illness During his service career he worked as a parachute rigger and had been steady and dependable Prior to his marriage he was a heavy drinker thereafter he drank only beer but consumed this regularly usually becoming drunk on weekends He had never missed work or received disciplinary action because of drinking and had advanced at an average rate considering several prolonged breaks in service

During the leave that preceded his illness the patient helped his father with some carpentry work at home He drank little until the last three days of his stay when he moved to a hotel because he felt his sister in law resented his presence He felt guilty about leaving his father to work alone He drank heavily with friends and relatives for the next three days and had a hangover when he boarded the bus He did not drink during the trip but he ate little because he was running out of money He continued to feel guilty about having failed to help more at home and this theme was prominent in his psychotic symptoms During his hospitalization he received no specific somatic therapy He was returned to duty three weeks after the onset of his illness

These two cases are typical of the travel syndrome Each individual drank heavily before starting to travel and in each, emotional stresses were present which influenced the psychotic symptoms In the following case, there was no history of alcohol intake, but there was evidence of a pre existing emotional disorder Recovery was neither so prompt nor so complete as in the cases above

Case 3 A 22 year old married Negro airman became psychotic while traveling to his home in the South after a tour of duty in the Far East While on a train in the Midwest he developed the idea that his fellow passengers were talking about him He began to hear voices accusing him of making improper advances to a girl on the train, and he was

Sensory examinations are sometimes difficult to interpret if the foreign body passes via the brachial or lumbosacral plexus into the region of the cord causing a mixed plexus and cord sensory loss This occurred in three cases with injuries due to a single shell fragment There is one case of an incomplete Th spinal cord injury that presented simultaneously a separate lumbosacral plexus injury causing unilateral foot drop Occasionally sympathetic changes were noted, such as unilateral Horner s syndrome in spinal cord injuries at C_4 C_7 levels and a striking difference in the temperature of lower extremities, one leg being warm and the other cold This latter finding was noted in two cases of Th_1 and Th injury with the foreign body lying in the spinal canal without evidence of damage to the sympathetic chain In this connection a group of six cervical and high dorsal spinal cord injuries with low body temperatures low blood pressures pulse and respirations is of interest (table 3) *Inability to prevent fall of body temperatures in one case to* 8° F is noteworthy in view of the low air temperatures at time of wounding In each case the casualty remained exposed to the cold for several hours Due to disturbed sympathetic mechanisms of the spinal cord the control of the body temperature was lost *A final hyperthermia up to 106 F 24 to 48 hours later* on a cerebral basis superseded the earlier failure at a lower neuronal level It is important to note that in four out of six cases the foreign body was a bullet Because of greater speed and penetrating power greater damage was caused extending to higher cervical levels The prominence of bullet wounds in this group is in considerable contrast to the over all ratio of 2 1 in favor of shell fragments (table 4) In all these cases the blood pressure remained low for several days in spite of repeated transfusions and absence or control of associated injuries Either at operation or autopsy the complete gross or histologic destruction of the spinal cord at high cervical levels was noted Priapism was noted in only eight cases at the time of the initial examination All these were complete lesions at levels from *C Th*

Peflexes No new observations can be added in regard to reflex examination With very rare exceptions in which a slow plantar response simulating a normal finding was obtained the initial suppression of all deep and superficial reflexes in the early phase gave way to the typical hyperactivity and plantar extensors in complete spinal cord injuries

Bladder function Usually the patient will volunteer the information that he is unable to void In cases of shock or coma it is far safer to insert a urethral catheter than to take normal bladder function for granted In this group of 201 cases only 40 cases (or 20 per cent) had normal sphincter function after injury and did not need catheterization

TABLE 3 Low body temperatures and related data in six spinal cord injuries

CASE NO	LEVEL	EXTENT	CAUSE	OPERATIVE FINDINGS	FREE AIR TEMP MIN MAX MEAN		DAY OF INJURY	D+1	D+2	D+3	D+4	D+5	D+6
80	C 5	COMPLETE	SHELL FRAGMT — PENETR	2/3 f p l ord se er d t appears off gr y h	56 72 64 (Fl e c ltly) May	T mp	90	94	96	98			
						P ls	90	90	90	90			
						Resp	16	16	16	16			
						BP	78/40	80/40	80/40	86/56			
							• •	↑					
63	C 6	COMPLETE	BULLET — PERFOR	Sp l ord hows m ltiple def ct ppe rs ott	31 47 39 (Munch Germa y) Apl l	T mp	82 86	84 86	88 90	96 100	103 104	105 106	
						P l	64	52	60	60 68			
						R p	14	16	16	16			
						BP	80/40	70/50	80/60	82/64			
							•			↑			
25	C 7	COMPLETE	BULLET — PERFOR	Sp l cord opp ars gr ssly l t b t ft	35 52 43 (So bu g F nc) F b a y	T mp		92 6	938 97			102 4	106
						P l		48	68 78			100	
						R p		11	16 18			26	
						BP		104/90	100/74				
							o					↑	
127	C 7	COMPLETE	BULLET — PERFOR	O ly th t a d t gl l d mol s	34 50 42 (Ulm G m y) Apl l	T mp	952 98	982 -986	101		104 106		
						P l	48 60 72	66 72	90				
						R p	24	24 28	32				
						BP	86/40 86/60	90/60	98/60				
								↑ •					
94	C 7	COMPLETE	BULLET — PERFOR	N p ll	56 69 62 (A ltaly) May	T mp	847	886 94	96 99	103 106			
						P l							
						R sp							
						BP							
							•						
9	D 2	COMPLETE	SHELL FRAGMT — PENETR	Sp l cord anat m cally t gos ct d	44 63 54 (Bolog a ll ly) Apl l	Temp		92 8					
						P ls		9 16					
						R sp		60 64					
						BP		84/54					
								o • ↑					

↑ OPERATION
o 250cc OF PLASMA
• 500cc OF CITRATED BLOOD

DEATH

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80	C 5	COMPLETE	SHELL FRAGMT — PENETR	2/3 of p l cord se er d st opp or soft or y h	56 72 64 (F c Italy) May	T mp	90	94	96	98			
						P l	90	90	90	90			
						Resp	16	16	16	16			†
						B P	78/40	80/40	80/40	86/56			
63	C 6	COMPLETE	BULLET — PERFOR	Spinal cord shows m ltipl defect ppe rs s ft	31 47 39 (Mun h Germ y) April	Temp	82 86	84 86	88 90	96 100	103 104	105 106	
						P l	64	52	60	60 68		†	
						R p	14	16	16	16			
						B P	80/40	70/50	80/60	82/64			
25	C 7	COMPLETE	BULLET — PERFOR	Sp l cord opp ar gr s ly i t ct b t s ft	35 52 43 (S orburg F nc) F b y	T mp		92 6	938 97			102 4	106
						P l		48	68 78			100	†
						R p		11	16 18			26	
						B P		104/90	100/74				
127	C 7	COMPLETE	BULLET — PERFOR	O ly th st d f pl l c d mol	34 50 42 (Ulm Germ y) Ap il	T mp	952 98	982 986	101		104 106		
						P l	48 60 72	66 72	90		†		
						R p	24	24 28	32				
						B P	96/40 86/60	90/60	98/60				
94	C 7	COMPLETE	BULLET — PERFOR	N p ti	56 69 62 (A i li ly) May	T m	847	886 94	98 99	103 106			
						Pul				†			
						R p							
						B P							
2	D 2	COMPLETE	SHELL FRAGMT — PENETR	Spn l ord not m lly t g t d	44 63 54 (B logna, It y) April	T m		92 8					
						P		9 1					
						R p		60 4	†				
						B P		84 54					

† OPERATION

25% c OF PLASMA

50% ~ CITRATED BLOOD

† DEATH

Bedsores While all bedsores occurred in either completely or incompletely denervated skin areas in one case a bedsore was found in an entirely normal skin area during the second week after the injury

TABLE 4 *Causes and extent of spinal cord injury*

Cause of injury	Complete spinal cord injury	Incomplete spinal cord injury	Total
Penetrating gunshot wounds			
Shell fragment	52	43	95
Metal fragment	10	2	12
Metal fragment	2	6	8
Bomb fragment	2	1	3
Hand grenade	1	1	2
Total	67	53	120
Bullets	34	26	60
Blunt injury			
Automobile	6	4	10
Fall	5	6	11
Total	11	10	21

Including gunshot fractures of the vertebrae from which fragments of bone were removed

CAUSES AND EXTENT OF SPINAL CORD INJURIES

The causes responsible for spinal cord injuries were foreign bodies and fractures The two types of foreign bodies most commonly seen were shell fragments of various types and bullets (table 4) Shell fragments ranged in size from a silver dollar to a pinhead In one case fine sand like lead particles were found These had penetrated all overlying structures of the back including the laminal arch finally reaching the spinal cord Oddly enough these foreign bodies were so densely distributed that on roentgenogram they appeared as if Lipiodol (brand of iodized oil) or Pantopaque (brand of ethyl iodophenylundecylate) had been injected into the tissues Most of the spinal cord injuries resulted from foreign bodies only 10 per cent were caused by fractures

Spinal cord injuries were fairly evenly distributed throughout the entire length of the spinal cord and cauda equina (fig 3) In this review all spinal cord injuries were divided into complete and incomplete lesions This refers to a functional not an anatomic interruption of the spinal cord or its tracts There were 11 complete and 89 incomplete spinal cord injuries Differentiating the various causative agents one can discern the effectiveness of bullets in the frequency with which they hit the cervical spine (fig 4) whereas no particular region is singled out by shell fragments (fig 5) As in many larger series

cervicothoracic and thoracolumbar junctions are well known as sites of fractures (fig. 6). Correlating these various agents with the degree of spinal cord injury one sees an almost even distribution of complete and incomplete lesions in fractures. In the shell fragments the prominence of complete lesions in the cervical and thoracic levels is quite evident: 55 complete lesions as against 25 incomplete lesions (fig. 5). The opposite holds true for all lesions below these levels. A similar relationship applies to bullets as a cause and may be explained by the mobility of the cervical vertebra and its ability to accelerate following impact by a foreign body. The lower one goes along the spinal column, the less mobile and more fixed does the vertebra become, thereby securing the enclosed cord against too rapid acceleration and greater histologic damage. Comparing spinal cord with cauda equina injuries one also finds twice as many complete injuries in cord lesions and a reverse relationship in caudal injuries (fig. 7).

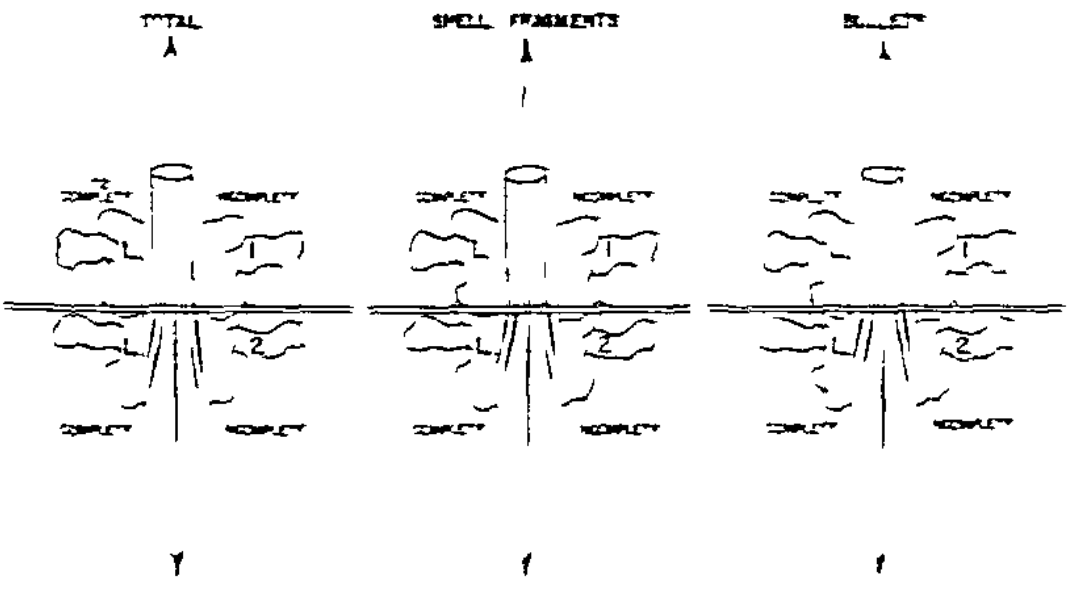


Figure 7—Differences in extent of damage between spinal cord and cauda equina injury.

The marked difference in damage caused by the various types of missiles is of interest. The fragments caused five times as many complete as incomplete spinal cord injuries, whereas mortar fragments had a reverse ratio of 1:3 (table 4). Bombs of explosive power and greater distances to travel but the penetration power in a mine is far greater than that of the smaller mortar shell. The muzzle velocity of bullets (about 2,000 feet per second) is twice as fast as that of shell fragments (up to 1,000 feet per second). Furthermore bullets lose relatively little speed on their way in contrast to the irregular shaped shell fragment that decelerates considerably with increased distances.

Yet with the exception of the small group illustrated in table 3 in which bullet injuries were twice as common as shell fragment wounds there is very little difference in this larger group in the ratio of complete to incomplete injuries caused by either missile No adequate explanation can be offered in this respect

INDICATIONS FOR LAMINECTOMY

At the beginning of World War II the guiding neurosurgical principles were outlined by neurosurgeons who had had experience in World War I Their negative attitude toward surgical intervention in spinal cord injuries was determined by the poor results and high mortality rates of World War I Eighty per cent died in the first few weeks only those cases survived in which the spinal lesion was a partial one If complicated by serious wounds of chest or abdomen cases were considered inoperable Even after the elimination of 8 cases considered inoperable 15 patients of the 24 operable cases in Harvey Cushing s series died Besides there was undoubtedly a lack of interest in the subject of spinal cord injuries About half the pages of Volume VI of the official World War I Surgeon General s report covers craniocerebral and the other half peripheral nerve injuries and only seven pages deal with spinal cord injuries

It is not surprising therefore that in the beginning of World War II a good deal of confusion existed as to treatment of these casualties Gradually with increasing numbers of laminectomies performed two basic principles evolved A laminectomy is indicated if there was the slightest doubt that a complete anatomic transection existed or if compression of the spinal cord could be demonstrated Neither the history nor the findings of a neurological examination can differentiate between physiologic possibly temporary interruption of function in an injured spinal cord from anatomic permanent and irreparable damage The demonstration of cord compression has its difficulties too Queckenstedt s test is not always reliable it was rarely done in this group and gave eight correct and six false readings in later demonstrated obstructions To rule out compression of the spinal cord by roentgenogram was at times impossible because the only available equipment being portable could not give details of vertebral or laminal outlines To look even with the help of stereoscopic views for evidence of bony fragments in the spinal canal was futile under those circumstances Even with the best roentgenographic equipment available the neurosurgeons usually were surprised with the far greater actual damage found at operation contrasted to the presumed damage as judged *from the films Also where the roentgenograms seemed* to indicate complete anatomic destruction of the spinal cord by the presence of a large foreign body in the spinal canal or by

demonstration of extensive damage to the spinal column, this was actually an uncommon finding on direct inspection In this group it occurred only in 12 cases from a total of 112 complete spinal cord injuries Because of these factors many more laminectomies were done in World War II and even if, in the final count the results are as disappointing to some observers as they were to those of World War I It was the humane thing to do and gave the patient and his family a clear cut prognosis "[7]

While more obvious progress was made and better end results were obtained in the care of brain or peripheral nerve wounds of World War II, the advance made in the care of spinal cord injuries was not so much in new technics or methods as in the attitude of a new generation of neurosurgeons This attitude in turn upheld the morale of the patients and was responsible for a positive and optimistic approach to every new problem or complication in the chronic care of these spinal cord injuries Whatever principles one abides by, the final result of whether the patient is clinically improved or remains unchanged should not determine one's course of action Furthermore, in a wound from a foreign body, there is no reason why the surgical principles to debride a wound tract and to remove the foreign body, if accessible should not be applied to spinal cord injuries as well This same attitude should apply to spinal cord damage due to closed injuries also

In civilian life, if all other methods fail, Pantopaque or related radiopaque materials are employed to determine the presence or site of cord compression This method was never applied in any of the cases under consideration The necessary equipment and the time were not available in the forward hospitals for this type of examination There is of course no reason why it could not be employed when feasible

COMPLICATING INJURIES

It is an important finding that one third of all cases of spinal cord lesion were accompanied by perforating wounds of chest, abdomen or both and in a few cases involving the kidney as well (table 3) As might be expected there was a correlation between the anatomic level of the spinal cord injury and these perforating wounds In cervical and upper thoracic cord lesions chest perforations alone were observed (fig 8) Two thirds of the cases of combined chest and abdominal cavity wounds had cord injuries close to the thoracolumbar junction of the spine (fig 9) and practically all abdominal perforations and penetrating wounds of the kidney were seen in cord injuries at the lumbar level (figs 10 and 11) These perforating wounds in themselves present a more serious problem than the cord injury as far as immediate care is concerned

The answer to the question of what injury should have thera peutic priority or the decision to postpone definitive treatment of one of the two lesions is not always obvious or easy Fre

TABLE 5 *Wo ds a c at d w th p al c d j t 201 cas s*

	N mb f ca es	P e t
N wo d o moderat wo d	142	70
Se re w unds	59	30
P trat g wound of ch t ca ty	36	18
P trating wound f ch t d bd mi l ity	12	6
P trat g w und f bd m l ty	10	5
L t f k d y	7	3 5

quently the handling of the problem in the early postoperative course seemed quite satisfactory to the forward surgeon only to impress the medical officer at the base as inadvisable therapeutic management This impression was formed after observation of cases that reached the base hospital with severe secondary anemia marked loss of weight or with extensive bedsores In these cases several operative procedures had been compressed into a relatively short time of 24 to 48 hours at the forward hos pitals The operative procedures in question ranged from simple *debridement to laparotomy It should be pointed out that the* over all postoperative course was ever so much smoother where the laminectomy was delayed until the patient had recovered from the early postoperative effects and therapy of a hemothorax or perforated viscus The practice seen not infrequently of turning a patient on his back immediately after a laminectomy in order to do a cystotomy seems hasty and unnecessary if one considers a cystotomy an elective procedure *to* be performed at any time These observations should not be interpreted as a hard and fast rule for in some cases a spinal cord lesion as *well as complicating injury may require immediate therapy* For instance a cerebrospinal fluid leak should be repaired at the earliest possible moment regardless of what other major surgical procedures are indicated A sucking chest wound or rforated viscus also must have priority and immediate c lless of all other coexisting wounds Once an o cra en decided upon it should be performed prompt

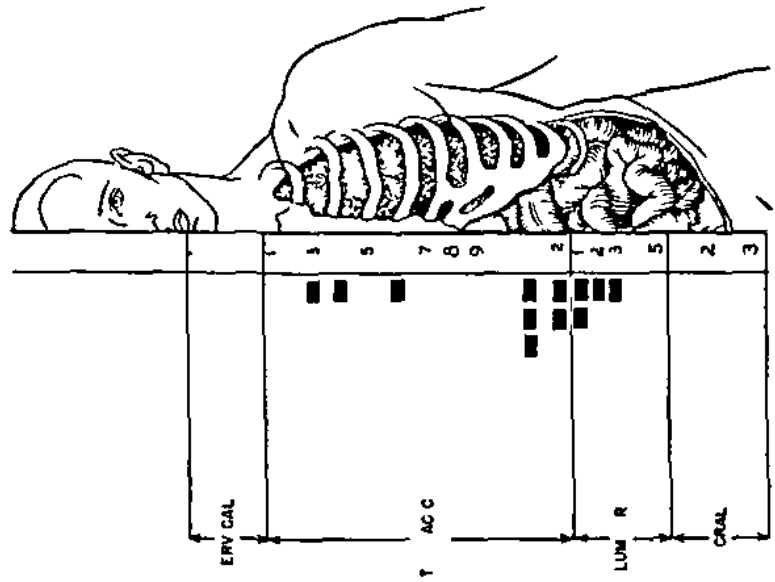


Figure 9 Anatomic relationship of penetrating wounds of chest and abdomen associated with spinal cord injuries in 12 cases

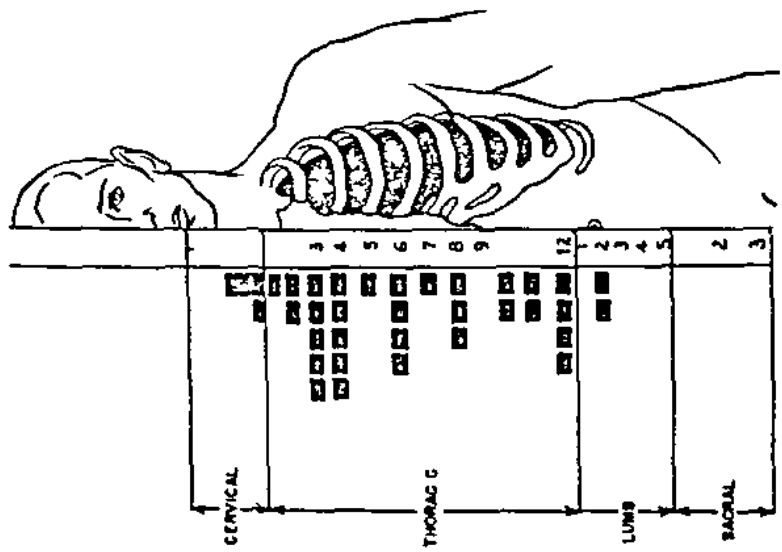


Figure 8. Anatomic relationship of penetrating wounds of chest cavity associated with spinal cord injuries in 36 cases

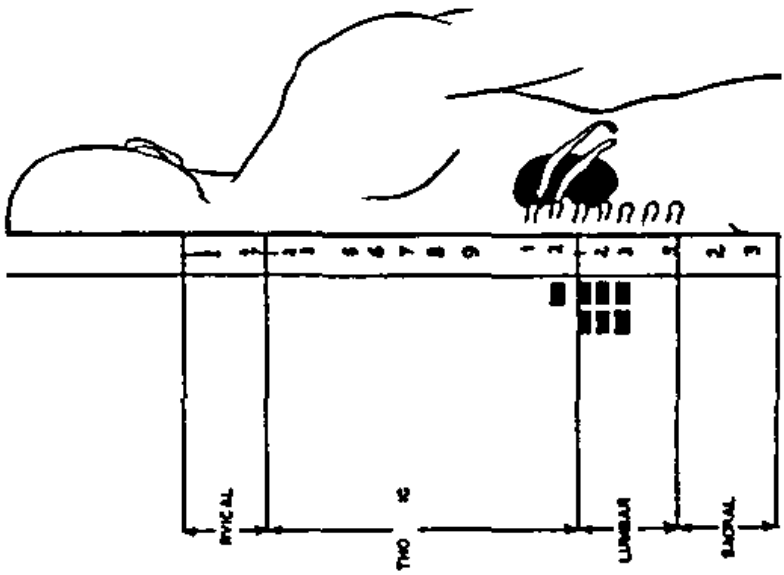


Figure 11. A typical pattern of tenderness with the patient lying on his side.

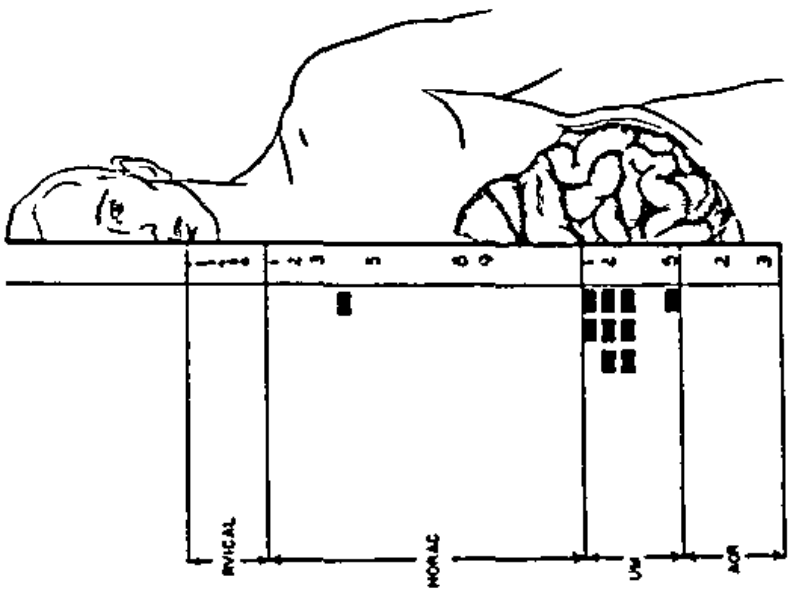


Figure 10. A typical pattern of tenderness with the patient lying on his back.

In addition to accompanying injuries, other complications may arise that might caution the surgeon against immediate operation Wound tracts crossing the proposed site of laminectomy may have become grossly infected, presenting distinct hazards on the postoperative course These infections are most commonly seen when difficult terrain or certain strategic situations have delayed the collection and evacuation of casualties who then reach the hospital late (table 2) In such cases two courses of therapy were chosen the first was immediate operation disregarding the infected wound tract, the second was to wait until the infection had cleared up sufficiently or completely to permit definitive surgery and closure of the operative wound In defense of the first course of therapy it should be stated that in this series, we saw only mild and inconsequential postoperative infections, only in three cases leading to fatal meningitis After the wound tract was cleaned out and the foreign body removed, wound infections cleared up rapidly In defense of the second course of therapy, a clean operative field will, of course, lessen the risk of any postoperative infection and most likely reduce the number of postoperative adhesions that are invariably present A good deal depends on the extent of the wound the severity of the infection and the amount of success in preparing a wound for operation We observed no distinct policy but were inclined to wait until the infected wound had cleared up, if the patient did not show any aggravation of his clinical signs and symptoms In this connection, a daily and sometimes hourly check up and comparison with the findings on admission should not overlook the function of the bladder More than once a patient was admitted, able to void who lost his voluntary bladder control while waiting for operation Not only does it take a good deal of time to regain normal sphincter or bladder function but it also adds another burden to the already difficult postoperative care

OPERATIVE TECHNIC

The technic followed corresponds closely to the usual decompressive laminectomy as done in civilian life, with the skin incision in the midline (fig 12) As the wound entrance frequently lies near or at the proposed site of a midline incision, two procedures were followed (1) Wound entrance, wound exit, or both together with wound tract were excised and the resulting defect enlarged further to expose the damaged lamina (fig 13) (2) The wound tract is left alone the surgeon circumvents it, if necessary with the help of a curved incision away from the midline and only at the very end of the laminectomy and its tight closure separately debrides the wound of entrance (fig 14) The latter method has been preferred by most surgeons In accordance with treatment of most war wounds of World War II the debrided wound tract was powdered with a sulfanilimide compound or an anti

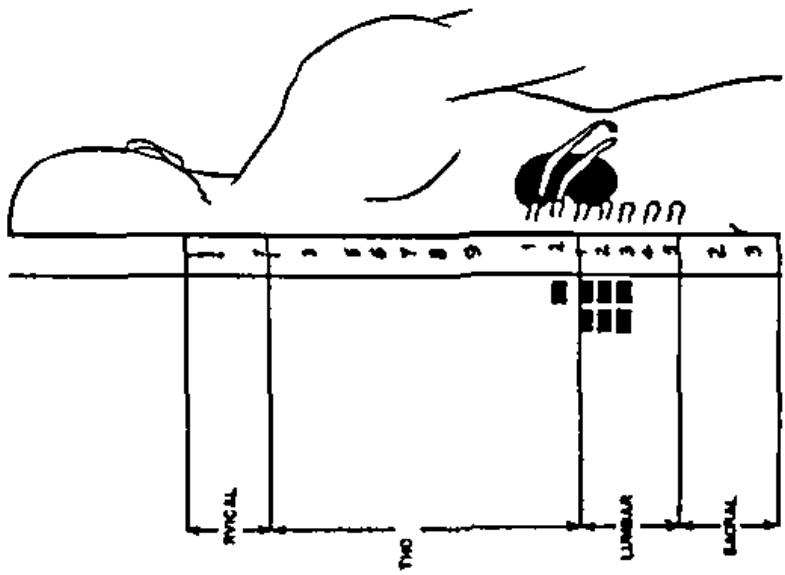


Figure 11. Anatomic location of pressure points used with digital compression to control hemorrhage from the 7 major arterial wounds of the extremities.

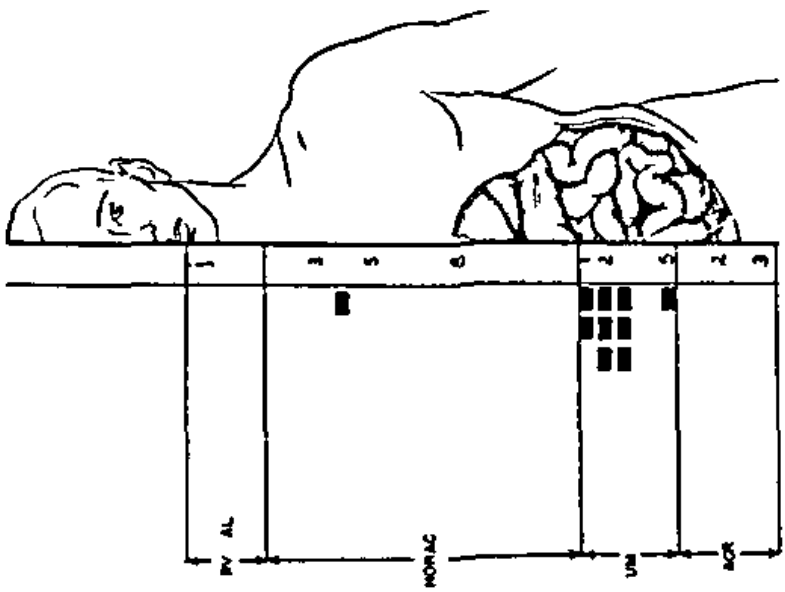


Figure 10. Anatomic location of pressure points used with digital compression to control hemorrhage from the 10 major arterial wounds of the extremities.

biotic, covered with vaseline gauze and left open The laminectomy should extend well beyond the site of the cord injury, preferably the width of one half to an entire lamina at both ends, the resulting exposure and decompression of the cord being much more satisfactory When treating depressed laminal fragments the same technic should be followed as for depressed skull fractures, namely, to start a laminectomy in an undamaged area and gradually work toward the depressed fragments, lifting them out



Figure 14 Complete spinal cord injury at L_1 Laminectomy incision circumvents debrided wound of entrance that lies in the midline

cautiously to avoid additional trauma In doing so one should be prepared to encounter bleeding from three sources The first of these sources is from the epidural veins anywhere along the spinal column The second source of bleeding is from the azygos vein in the thoracic segments This was encountered in lateral wounds entering from the chest or abdomen During the laparotomy or thoracotomy these azygos hemorrhages are accessible and relatively easy to control They are however very difficult to reach from the customary laminectomy approach and occur usually when loose fragments of bone are lifted out having until then compressed severed blood vessels The third source of bleeding may be the vertebral artery which may start a severe hemorrhage on removal of a relatively small bone fragment from a damaged transverse process This was encountered in one case and was quite difficult to control

No agreement exists whether or not to open the spinal dura mater It has been the author's personal policy to open the dura expose and inspect the damaged cord in every case unless the operative site was grossly infected making this step inadvisable Especially in instances of foreign bodies located extradurally, this policy was found necessary because further pathologic findings were encountered under the dura such as small later

ships with parents school adjustment and employment together with the prisoner s prior adaptation to the military service were used as the principal prognostic indicators rather than place any strong reliance on psychometric tests or impressions of clinical pathology In effect techniques of proven effectiveness such as described by Glass and associates in addition to the record of military adjustment were used

In order to expedite the study those prisoners who had three or more court martial convictions during their present enlistment were considered as unfit that is their disciplinary records alone were considered as sufficient basis for their presentation to a board authorized under the provisions of Army Regulation 635 208 It was not the function or the intent of this study to rigidly define the unfit soldier There was complete awareness that this is the rightful function of the unit commander and the 208 Board concerned and that each case must be considered on its individual merits and arbitrary and incomplete criteria could not be applied to all cases in an untempered fashion It was thought that the criterion of three court martial convictions though less comprehensive was not inconsistent with the spirit of Army Regulation 635 208 The classification of prisoners as unsuitable was based on the presence of such personality defects as outlined in Army Regulation 635 209

Those prisoners who were not classified as unfit or unsuitable by the interviewing agency were considered for purposes of this study as likely to benefit from rehabilitation Although this category is defined somewhat negatively it was thought that this was in keeping with existing Army policy on administrative separation Where there was no positive evidence that a person had an extensive disciplinary record or some serious personality defect which would preclude satisfactory service in the future it was believed that efforts should be made to rehabilitate that person and to retain him in Service For the most part the men in this category had been or showed promise of being good soldiers The offense they had committed was in response to some particular problem which had no reflection on their overall ability Personal interview with these soldiers frequently brought to light specific stresses such as domestic crises or job misassignments which helped to precipitate the offense Specific attention directed at the solution of these problems would have been a positive step in the rehabilitation of these men

Findings and discussion Of the prisoners about to be released from confinement 36 per cent were found to have records of three or more court martial convictions during their current enlistment Such a disciplinary record is sufficient to cast considerable doubt on a person s fitness for service It was suggested that these men might have been considered for presentation

to a 208 Board on the basis of established administrative criteria

Twenty four per cent of the prisoners about to be released from confinement were judged by the interviewer to have sufficient personal inadequacies to warrant presentation to a 209 Board established under provisions of Army Regulation 635 209 for consideration The large percentage of inadequate personnel about to be returned to duty indicated that, for one reason or another, these soldiers were not being identified even after they had been brought to the attention of their unit commanders by one or more disciplinary infractions

Forty per cent of the prisoners about to be released from confinement were not classified as "unfit" or unsuitable Thirty two per cent of the prisoners demonstrated promise of being good soldiers while the remaining prisoners were considered to be questionable cases who should be given the benefit of the doubt and returned to duty Those that had been considered for administrative discharge under the current system of identification constituted a negligible percentage of the group investigated

In general the assumption that unfit and unsuitable personnel could be identified effectively at the post stockade was supported by this study From the findings it was concluded that 1 It seems preferable to identify and process the substandard soldier while in the stockade rather than return him to his unit for processing Releasing him to duty affords the man another opportunity to commit a new court martial offense before discharge can be effected 2 Such a procedure does not return to the company a man most likely to be a bad influence on the morale of the others and does not prolong unnecessarily the time that an unsatisfactory soldier must be maintained at government expense 3 Processing the man while in confinement causes no disruption and minimizes the administrative inconvenience to his organization 4 Locating the evaluative program in the stockade has an advantage in that it would benefit the confinement officer in his rehabilitative efforts 5 If the stockade is to return men to duty better fitted for service than they were at the time they committed their offense one of its functions must be that of re educating or retraining It appeared the screening agency would be able to aid in identifying for the confinement officer those men capable of profiting from such measures and make specific recommendations on the handling of prisoners as the need for individual attention arose

The findings and the experience encountered in this study clearly demonstrated areas in which the professional services of a psychiatric unit could be used and gave some general idea as to how this might be done Several factors limiting the establishment of procedures programs, and policies became equally

obvious The experience in administering and in making use of the necessary measures was for the most part inadequate A smooth well worked out program with intricate co ordination and careful planning could not be imposed *en masse* on the pres ent organization Those even remotely connected with the stock ade from the post commander to part time guard must under stand and be sympathetic with the program It therefore became necessary to implement the pro_ram step by step examining success or potentialities and above all proving to all concerned that the practical benefits derived more than compensated the necessary effort required The progressive implementation of the program covered an 18 month period *from January 1956 to* July 1957 and was established essentially as indicated in the subsequent description It is not presented as a finished product any areas need further exploration research expansion and verification but as judged by ease of administration enthusiasm of its participants minimal personnel demands flexibility prac tical acceptability and the appropriateness of its goals in com pliance with those of the military it is worthy of presentation

TABLE 1 *St t t l b akd u f 170 pri p st t ckad at t me f t k t rv w*

		N mber	P cent
Sour f prison t	Speci l proc ing d t chm t	78	46
	P t un t	51	30
	Off the-po t un t	41	24
			100
Inc den f court mart l	C urt mart led	70	41
	To b court m rt led	100	59
			100
Offen e	D sert on	33	19
	AWOL	107	62
	L y	11	6
	I ubordinat on	6	3½
	A lt	4	2½
	M c llan ou off	12	7
			100

Thr f th 170 p so et w h g d w th two ff h

The pri oner screened under this new pro_ram came from off post units a detention detachment post units and anti aircraft units Table 1 sho s a monthly statistical breakdown of prisoners at the time of intake and is considered typical of such reports

The entire responsibility for the over all operation of the program was assumed by the confinement officer He made the final decision as to which prisoners would be recommended to their commanding officers for board action This responsibility of the confinement officer in no way violated the prerogative of the unit commander to initiate administrative board action for substandard personnel in his command The commanding officer would accept or reject the recommendation of the confinement officer as he saw fit

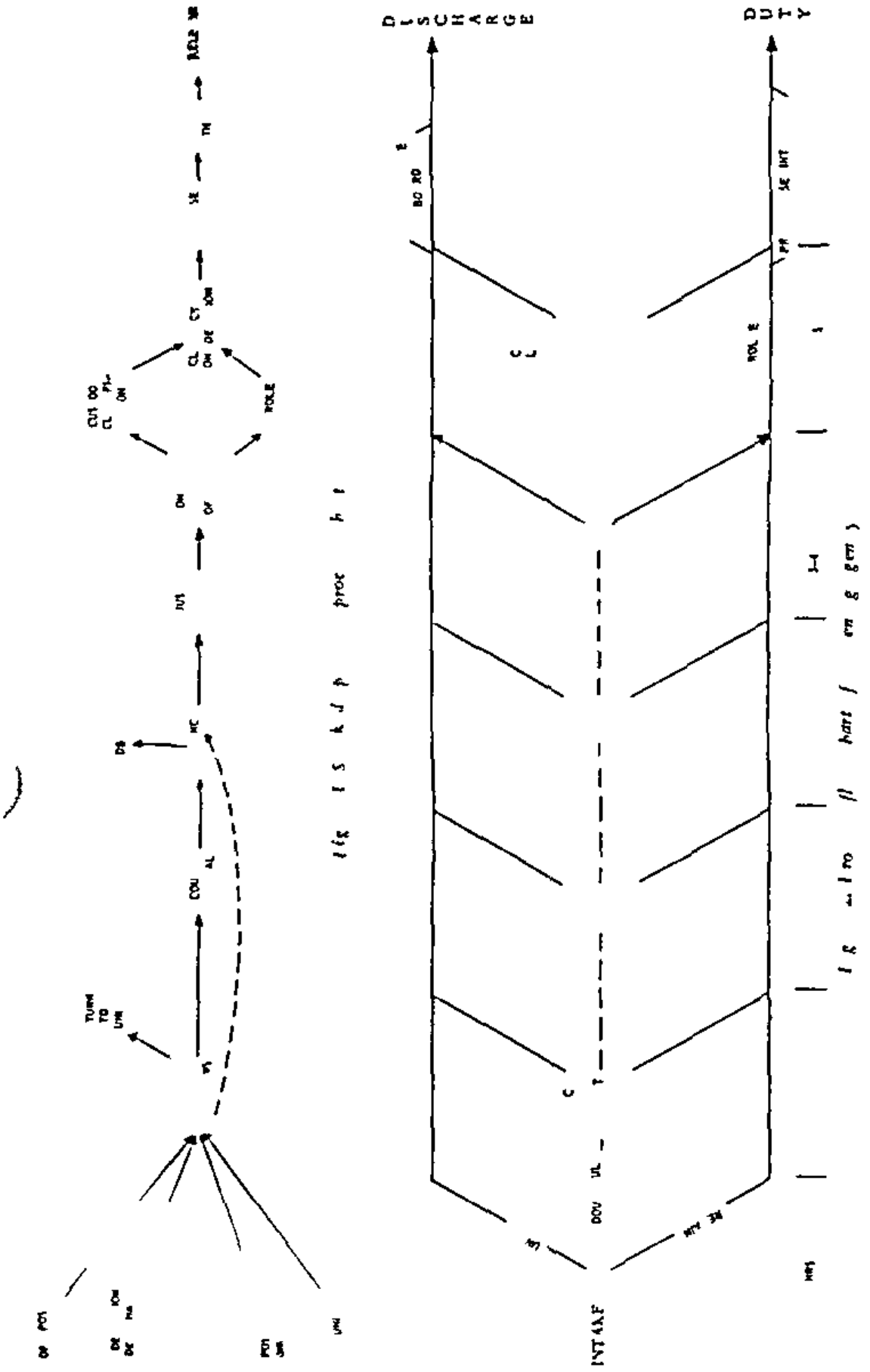
The role of the consultation service in the program was to provide technical training and supervision for the social work specialists interviewing the prisoners, and accomplish psychiatric evaluations and clearance of prisoners where indicated The entire screening process (figs 1 and 2), was conducted by enlisted social work specialists who were assigned from the Consultation Service to the MP unit providing support for the stockade

INTAKE PROCEDURES

Data for the entire program were developed from the information gathered and evaluations made during the intake procedure, which was part of the routine processing of each prisoner The intake interview was accomplished within 24 hours after admission by the enlisted specialists conducting the program Conducting intake interviewing soon after admission prevented the incoming prisoner from being influenced before the interview by prisoners already in the stockade and gave the specialist the opportunity of using to his advantage the emotional impact of initial confinement, which often caused the soldier to reveal feelings which otherwise might have been hidden The intake interview included the orienting of the prisoner and the gathering of information for further use in classification and rehabilitation

Interview During the interview, the specialist reviewed, in a rather permissive manner the reason for the prisoner's being in the stockade, conducting a general discussion of some of his problems with the implication that in some way he could be helped to solve it The attitude of the specialist was one of acceptance with very little questioning He made his position clear—his position as a part of the stockade rehabilitation program with no other interest or reason for asking about the prisoner's background, assuring the prisoner that the questioning had nothing to do with investigation for court martial procedures In his relationship with the soldier, the enlisted specialist remained neutral as far as possible, not identifying himself with either the prisoner or with the staff of the stockade

The limited social history which he obtained concerning the prisoner included military, work, social, family, and school ad



justment How did he get along with his family? How had he fared at school? What was his status scholastically? How had he adjusted and progressed at work? Had he had any difficulties in military assignments? Often during the course of the discussion, the obvious motivation for disciplinary difficulties disclosed was situational, for example, financial difficulties or inconsistencies in military assignments

Administrative procedures In addition to conducting the interview, the specialist had certain administrative duties related to intake As indicated, he sent for collateral information, including medical reports, home and social reports, and police and school records The collateral information was an asset in attaining the objectives of the program because it made disposition clearer and added to information concerning prior adjustment The specialist attempted as far as possible to collaborate information on details of the difficulties described by the prisoner and to obtain a clearer picture of the possible situational stress surrounding the offense

The specialist also reviewed the prisoner s records of previous offenses efficiency and character ratings, letters of commendation and other information useful in evaluating the prisoner This included obtaining abstracting and evaluating the prisoner s 201 File The information obtained from the 201 File reflected additional information such as frequent shifts in assignments and previous military occupational specialties It gave a rough idea of some of the prisoner s assets, such as specialized training and positions of responsibility and some of his deficits such as prior disciplinary offenses and low efficiency and conduct ratings

Inasmuch as it is the prerogative of the unit commander to initiate administrative discharge procedures on nonefrective personnel under his command his opinion of the prisoner was requested so that he could evaluate various areas of military adjustment and present his viewpoints as to the prisoner s potentiality in the military setting The commander was requested to rate the soldier as critically and as accurately as possible and in comparison to other men in the unit who were of similar experience, rank and length of service To obtain this information the specialist forwarded a questionnaire the Individual Rating Scale to the commander The Individual Rating Scale was a detailed form containing questions with a multiple choice of answers provided for each It was necessary only to place an (x) along the line of the most appropriate answer cross out words considered inappropriate or add words considered necessary A detailed form was used because it was easy to complete and for this reason more likely to be fully answered It covered a wider range of information than the usual questionnaires In

addition by completing the form the commanding officer often committed himself to future actions

After obtaining all the available information on the prisoner the specialist made an appraisal of the potentialities of the prisoner for further service

Significance of the intake procedure In the intake interview it was of help to the prisoner to know that in his contact with the specialist he had found someone who was interested in his problem that some attempt was being made to give him help and that if confinement was indicated for him it would not be a completely barren experience In this interview some of the prisoner s problems were identified aid in their solutions from then on would be a continuous process for the period of confinement. To the basic information and evaluations resulting from the intake interview would be added more information and new evaluations based on results of the adjustment interview to be conducted later observations of and reports on the prisoner s behavior in the stockade and a continuing evaluation of the prisoner s adjustment Additional information would be obtained through review of the prisoner s weekly stockade records and contacts with guards and custodial personnel and would involve such aspects as the prisoner s appearance attitude work performance and conformity to rules The problems of the prisoner were handled in continuum—from the time of intake to the time of release

INITIAL CLASSIFICATION

On the basis of the information gathered and evaluation made in the intake interview records review and responses of the unit commanders to the questionnaire the prisoners were tentatively divided into one of three categories (1) those considered unfit or unsuitable for further duty as defined in various regulations (2) those whose potential needed further evaluation, and (3) those who appeared capable of responding to rehabilitation If a prisoner had an emotional problem of sufficient severity he was referred to the consultation service If he had a problem which normally was handled by the medical officer in the stockade or by agencies such as the Red Cross or the Army Emergency Relief the appropriate referral was made If after intake a prisoner was identified as rehabilitative all the material that had been gathered concerning him was referred directly to the consultation service for further review to determine if additional action or more formal therapy was warranted

Those considered unfit were recommended to their commanding officer for administrative board action Certain criteria within the framework of Army Regulations 635 208 and 635 209 and Second Army directives were established to identify tentatively

substandard personnel These criteria were applied by the en listed specialist, confirmed by the consultation service, and reviewed by the confinement officer Prisoners having three or more court martial convictions on their current enlistment or frequent punishment under Article 15 of the Uniform Code of Military Justice,[6] or other disciplinary difficulties in combi nation with one or more previous court martial convictions were considered candidates for separation under Army Regulation 635 208 One prior conviction was regarded as sufficient when the offense had been an especially serious one, such as larceny, and where, because of the character and history of the prisoner, the likelihood of future repetition was great The unsuitable category was determined by the presence of disabling personality defects as outlined in Army Regulation 635 209 These defects were initially identified through the personal interview and other evaluative procedures and were confirmed by a review of such cases by the consultation service

When it was decided to recommend a prisoner for board action, a letter setting forth the recommendation and the reasons for it together with any pertinent psychiatric reports, was sent to the commanding officer concerned The recommendation that the commanding officer initiate action was signed by the post commander, since his recommendation carried with it more of a note of authority The post commander also constantly re viewed criteria for presentation to the board In the recommend ation the commanding officer was advised that the prisoner could be processed for board action while still in confinement (The unit commander could still, of course, initiate board action on confined personnel without a recommendation from the confine ment officer) In some cases it was brought to the attention of the commanding officer that there were other bases for admini strative discharge which had been discovered such as fraudu lent enlistment Very often it was found that the commanding officer was unaware of some of the factors involved, and this program offered a method of giving him further information which might be a basis for his decision

It was natural that there would be some cases in which there would be a certain element of doubt Doubt may have been initial ly due to insufficient information however, there were cases in which, even with sufficient information, there was still some doubt These prisoners were retained and further evaluations made Occasionally, doubt was resolved on the basis of the prisoner's behavior in the stockade

In general, the rehabilitation potentiality of prisoners was determined by evidence of (1) reasonable degree of success in prior employment, school work, and family relationships (2) es sentially healthy interpersonal relationships (3) basic moti

ation to fulfill obligations and responsibilities (4) reasonable emotional health and (5) satisfactory previous military duty

When the sentence of a prisoner did not indicate confinement the case was referred to the consultation service for further action If sentences of prisoners were for periods in excess of 6 months they were usually sent to a disciplinary barracks with little delay

ADJUSTMENT INTERVIEW

The next step in the processing of the prisoner was the adjustment interview which also was conducted by the enlisted specialist During the time between the intake interview and the adjustment interview the prisoner had usually developed certain attitudes toward the Army the stockade and the idea of confinement. He already had been sentenced at the time of the adjustment interview and perhaps was experiencing a sense of relief in contrast to a feeling of hostility or apprehension experienced before the court martial By this time he had made an appraisal of himself and there was a reflection of the way he was influenced by groups in the stockade Very often a profound change had taken place in the general attitude of the prisoner during the time between the two interviews He may have become more determined to solve his problems or he may have become more hostile The attitude of the prisoner at the time of the adjustment interview was of great significance in his solving the basic problem which led to his confinement and in appraising his potentialities The aim of the specialist was to utilize positive attitudes to the advantage of the prisoner where possible so that he could be in a better position to cope with his problem

The chief objective of this interview however was to determine motivation for service It consisted of three phases (1) ascertaining the prisoner s attitude toward confinement (2) orientation toward authority and (3) counseling on problems which led to the disciplinary action

The following general areas were explored during the prisoner s interview

1 How did he view his offense? How was it avoidable? What would prevent its recurrence?

2 Did he feel his sentence was just?

3 What was his attitude toward confinement? How was he taking it? With whom did he identify?

4 What was his attitude toward parolee status?

5 What was his attitude toward future service?

The prisoner was oriented regarding administrative matters relative to his imprisonment Implications of various types of

discharges were discussed, and the parolee system was explained Various available resources which were particularly applicable to the prisoner's offense were explained In counseling the prisoner, problems were explored which were likely to cause maladjustment, including those at home with parents or family, financial, emotional, and those involving the company and assignment Implications of problem handling were discussed and additional necessary referrals made to the agency best suited to handle them

Administrative procedures For the adjustment interview, it was necessary for the enlisted specialist to

1 Ensure that all reports obtained or requested from intake were available including the commanding officer s evaluation personnel file summary and collateral information

2 Obtain shift leader s reports

3 Refer to the proper agencies any problems or ensure that action was taken if already referred

4 Forward pertinent information to the confinement officer to aid him in the final custody classification

5 Check on status of administrative and other recommendations

6 Initiate recommendations for processing under the provisions of administrative regulations if indicated

CONFINEMENT OFFICER REVIEW

The confinement officer after studying and evaluating all available information and the evaluations provided by the enlisted specialist interviewed the prisoner On the basis of this study and interview, he made decisions regarding the management of the prisoner He used the evaluative study to aid in classifying the prisoners in the custody believed proper in terms of one of the three degrees of custody classification and made recommendations concerning restoration to duty, clemency and parole and considered the advisability of recommending administrative separation from the service

PAROLE PERIOD

In the eventual classification of prisoners into two categories—those identified as potential material for rehabilitation and those considered capable of being rehabilitated satisfactorily—only a small part of this determination was based on the prisoner's apparent motivation, that is, what he said A similar dichotomic distinction was made of the prisoner population regarding those who did and those who did not identify with or accept authority, both as exemplified by the stockade personnel and the disciplinary limitations placed upon the prisoner as well as the authoritarian model that resulted from the prisoner's concept of Army authority

INTERVIEW WITH OFFICER

Following the prerelease interview the enlisted specialist having notified the commanding officer of the impending release of the soldier talked with him explaining what had been learned of the assets and deficits of the soldier and provided him with a complete account of all the information and evaluations that had been accumulated After receiving the information from the enlisted specialist the commanding officer was better prepared to understand the problem and the current attitude of the soldier and to conduct an interview with the soldier in which both he and the soldier would profit Through this interview if necessary he could then aid the soldier in rehabilitation picking up where the stockade had left off

RESULTS

Although there was some apprehension as to the position of screening personnel in relationship to staff and prisoners they were able to maintain the confidence of both groups The guards although suspicious at the beginning rapidly became enthusiastic about the program and often approached confinement staff specialists and members of the consultation service with questions regarding the prisoners or with unsolicited observations of prisoner s behavior

The number of guards was reduced to about 95 per cent of the original number In spite of the parolee program the number of escapees remained the same or less The number of prisoners under maximum custody varied from time to time but was never greater than before the screening procedure The incidence of attempted suicides or gross psychiatric problems was substantially less The patient load origination from the stockade to the consultation service was reduced to one half and emergency calls to the consultation service ceased almost completely

CONCLUSION

The experience in the evolution of the stockade program generated the following tentative conclusions although an accurate statistical follow up study was not possible

1 The success and acceptance of such a program is enhanced by its gradual evolution and demonstrated value of each step This allows adequate evaluation of each phase by all concerned and often provides a clue to the next possible development

2 The advantages of placing the responsibility for the program in the hands of the confinement officer are obvious but there is a natural disadvantage in that the program is dependent upon the capabilities and enthusiasm of the officer Fortunately this risk is in our experience minimal because of the increasing

attention given to selecting well trained, capable officers and the obvious personal and professional advantages of the system

3 With well trained, intelligent, well motivated social work specialists and close professional supervision, the program proved successful with only minimal demands upon the time of the staff of the consultation service

4 Apart from screening, which seemed to fulfill its purposes most adequately, the program provided an aid to rehabilitation which was voluntary and based on increased responsibility, military training, and increased personal benefit The soldier was provided with a choice and because his offense was more often based upon immaturity rather than on antisocial or criminal behavior he willfully and consciously made a choice that not only was personally profitable, but led the way to his successful reintegration into his duty role as a responsible, effective soldier

REFERENCES

1 Menni g r W C. *Psy h atry m a T oubled Wo ld.* The M cmillan Comp ny New Y tk N Y 1948 pp 509 511

2 Schle singer N and Bl u D Psych tric st dy f r t aining command *U S Armed F c s M J* 8 397 405 Mar 1957

3 Army R gul t o 635 208 D *harge Undes able Habits and T a ts of Character* M y 21 1956

4 Army R gulat n 635 209 *Discharg* Inapt tud o Unsuitability M r 17 1955

5 L k B C mp r on of n v l ff de w th offende s n pto) ct ve ente c mpl ti n te t *U S Armed Forc s M J* 8 1825 1828 D 1957

6 Gl A J Ryan F J Lubi A R man C V and T k r A. C P ych atr c pr dicti nd mil t ry ff ti e e *U S Armed Fo c s M J* 7 1575 1588 Nov 1956

7 H k ff L D R p d ut ey f d l nqu nt servicemen *U S Armed Fo c s M J* 9 107 111 Ja 1958

8 *Mar al f Court Martial Un t d States* 1951 Articl 15 Comm ding off c r s l d l pun hm t pp 417 418

HABITS v THEORIES

Is coronary atherosclerosis preventable? At the present time it is not Reduction in the percentage of fat content in an American diet and ce sation of cigarette smoking might lower somewhat the incidence of this important con dition but it is unlikely that these measures will be prac ticed on a large scale for habits have a stronger hold on men than do theories Effective prophylaxis must await accumulation of basic knowledge relative to the etiopatho genesis of atherosclerosis and coronary disease —William L Proudfit Is *Coronary* Atherosclerosis Preventable? *Journal of the Iowa State Medical Society* January 1959

HERPES SIMPLEX KERATITIS FOLLOWING FEBRILE ILLNESSES

JAMES E LEIBOLD *Capt USAF (MC)*

FOUR patients seen during the Asian influenza outbreak in Colorado in the fall of 1957 developed herpes simplex (dendritic) keratitis in association with the influenza and in a fifth patient the condition was associated with a common cold It is hoped that presentation of these cases will make medical officers other than ophthalmologists more aware of this disease as a possible complication of a febrile illness The possibility of this serious ocular disease should be considered in patients who complain of red eyes or eye irritation in conjunction with or following attacks of influenza or common cold Often these ocular complaints are erroneously classified as a *cold in the eye" or as associated conjunctivitis*

The treatment of herpes simplex keratitis is difficult and the disease can have serious consequences Severe scarring and vascularization of the cornea can result with corresponding decrease in visual acuity If herpes keratitis is properly diagnosed and treated in its earliest phase these serious sequelae can be minimized The advantages of early diagnosis and treatment and the difficulties of late therapy are illustrated in the case presentations

DIAGNOSIS

As this paper is primarily directed to nonophthalmologists a few points in the diagnosis of herpes simplex keratitis by means readily available to medical officers will be outlined The first sign of dendritic keratitis usually is conjunctival injection and ciliary injection visual acuity is reduced Symptoms of pain can vary from a foreign body sensation to severe pain The corneal nerve endings are affected by the disease and often after two or four days the pain subsides and there is a corneal hypesthesia A secondary iritis is almost always present and this causes photophobia In more advanced cases the corneal ulcers can be seen by oblique illumination and the epithelial defect will cause a shadow on the iris They are more easily seen after staining with fluorescin If the dendritic shape of the ulcer cannot be seen by the naked eye it can often be seen by

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From the U S A F Hospital Lowry Air Force Base Colorado

magnification with a loupe Slit lamp microscope findings will not be discussed inasmuch as this method of examination usually only is used by ophthalmologists

Herpes simplex keratitis can be recurrent, as the virus apparently lies dormant in the corneal epithelium and is activated during febrile illnesses Herpes simplex can remain latent between attacks with no damage to cells in the quiescent phase [1] For this reason, careful past history of ocular disease often is helpful in diagnosis

TREATMENT

Once the diagnosis has been made or suspected, the patient should be referred to an ophthalmologist for treatment As mentioned earlier, the treatment is difficult and consists in the main of cautery of the ulcers with iodine (3 5 or 7 per cent) trichloroacetic acid, or ether This chemical cautery kills the cells which harbor the virus The eye is atropinized to treat the secondary iritis and to put the eye at rest, and a firm dressing is applied

Smallpox vaccination can be given to build up general immunity There is no specific herpes simplex vaccine that is successful, and the immune response of the body is rather poor, especially in repeated infections Hallet, Naib, and Leopold[2] inoculated rabbits with polyvalent influenza virus vaccine both 14 days before the rabbit corneas were infected with herpes simplex and on the first and third days after infection of the cornea As compared with a control group, they found that this attempt to build up general immunity and lessen the severity of the herpes keratitis was completely unsuccessful

Formation of antibodies in primary herpetic infections is variable, but there usually is a rise in antibodies in the first infection In recurrent infections, however, it is seldom possible to detect significant rises in antibody titer and attempts at immunizing patients have been unsuccessful The smallpox vaccination often used as part of the treatment of herpes keratitis is, of course, not specific and there has been no real proof that it is of great value, but it is certainly worth a try

Cortisone is specifically contraindicated in the active phase of dendritic keratitis and, if used, may cause corneal perforation, uveal tract involvement, and increased chronicity of the disease [3] In experimental studies large intramuscular doses of cortisone have caused prolongation of the acute phase of the disease and delay of healing Systemic as well as local use of cortisone, therefore, is to be avoided

CASE REPORTS

Case 1 Two days after recovery from Asian influenza a 10-year-old girl s right eye became red and painful and a vesicular rash developed in the right periorbital region This was diagnosed in another city

as impetig The skin and eye were tre ted with cortisone When seen by me five d ys after th onset of the eye involvement the rash had clea ed but there was a typical herpetic ulce of the cornea There was severe redness pain and photophob and visual acuity was decreased Two y ars previou ly the patient had h d a keratitis in the ame eye follow ng a febrile illness and ssoc ated w th a vesicular rash in the peri bital area It is thought that the impetigo was in reality herpes simplex l sions and that cortisone should not h ve been used in treating the eye The ulcer cleared after two weeks of t e tment but the resulting scar has impaired the vis on to 20/40 as determined by a s x month follow up

Case 2 A 25 year-old ai man presented himself in the eye clinic with a compla nt of a fore gn body ensat on in the l ft eye of 12 hours duration Exam nati n revealed photophobi ciliary injection and decreased visu l acuity and a typic l d ndritic ulcer could be seen grossly by oblique illumination of the corne Five days p e viously the p tient had be n a sign d to quarters with a d agno is of Asian influenza Two days after th onset of this illness he devel oped multiple herpe simplex lesion of th upper lip and the eye involv ment followed this by about 48 hours The ulcer was cauterized with iod n and th ey wa completely clear n 10 days w th no impa rment of v ual acuity

Case 3 A 20-y ar old youth was placed on quarters w th a diag nosi of Asian influ nza and two days lat r he devel ped a herpe sk n le ion t the left nostril Forty eight hours following this he came to the eye clin complaining of i ritation and redn s of the left eye There was past hi tory of herpes ker titis two ye rs pre viou ly which resulted n scarri g nd some superficial v s ular- izat on of the cornea Examination evealed a r d eye and much photo- phobia There were two small round stained areas of the c rnea typical of a metaherpetic k r tit s This s the form that recurrence of herpe s mplex ofte take The eye was atropinized nd p tched and after seven days w s completely clear Two nd one half month l te the patient devel ped a cold which w s followed by the same cular symptoms Treatment was instituted immediately and the eye clea ed in fiv days

Case 4 Two days after recovery from As an nfluenza a 19-ye r-old youth noted redness of both eyes Twenty four hours later hi eyes h d become p inful and en iti e to light and visual acuity was m rkedly dec eased This was dia nosed s conjunctivitis by a gen e al medical officer and treated with loc l antib otic nd nesthetic Two day later the ophth lmolog st was called in consultation and v e b lateral herpes simplex k ratitis was found The ulcers which ext ded lmost the entire length of the corn a n the right eye nd just t th t al portion of the c rne in the left we e cauter zed nd the y w at op nized and patched The patient wa hospital ized 21 d fo th ye cl ared and the e ult ng sc rs caused dec e e sual c ty of the right eye Neovascul rization of the h ght ey occu d and ix m nth later the p t e t

is still under treatment in an attempt to minimize growth of new vessels In a six month follow up this patient had one recurrence of herpes keratitis in the left eye This was observed three months after the original episode and was in association with a common cold Treatment was instituted immediately this time and the eye was clear in five days with no further impairment of visual acuity

Case 5 A 9-year old girl developed a cold and fever and two days later the left eye was red painful and sensitive to light The pediatric clinic diagnosed the condition as conjunctivitis A cortisone antibiotic ophthalmic ointment was prescribed and in three days the eye was no longer painful but remained red and sensitive to light Ten days later the patient was seen by the ophthalmologist and the visual acuity was less than 20/200 There was no pain as the corneal sensitivity was markedly reduced because of the large dendritic ulcer The ulcer had to be cauterized three times and the eye did not clear until 50 days after the onset of symptoms The scar is vascularizing and the distant vision was 20/40 Six months later the eye again became slightly red and painful Immediate examination revealed a small ulcer on the old scar This recurrence was treated conservatively by patching and dilatation and the ulcer cleared in five days Vision is now 20/70

DISCUSSION

Cases 1 4, and 5 illustrate the long, chronic course and serious complications of the disease when diagnosis and treatment are delayed Cases 2 and 3 point out the relatively short course and lack of sequelae when early diagnosis and treatment are instituted In three cases a recurrence of the disease was seen in a six month follow up, and two were associated with minor febrile illnesses while one was not The importance of taking a past history regarding ocular diseases when diagnosing a red eye is illustrated by the case histories and follow up studies

SUMMARY

Injection, reduction of vision, pain and photophobia of an eye should make one suspicious of herpes keratitis in patients with febrile illnesses Contrast between sequelae of three cases in which diagnosis and treatment were delayed and in two cases where early therapy was instituted, is demonstrated

REFERENCES

1 Thyg n P V d it d s of y p r rti l nat of vir s s *Arch Ophth.* 29 285-300 F b 1943

2 H ll J W N b k d L p M I H C n l f p tm t l h rp s im pl t k t h m l c l ntibi t c th r py *A M A Arch Ophth* 54 573-5 9 O t 1955

3 Thyg n P d k m S. J D p f rm f h rp tic k r titl *Am. J Ophth* 43 109-113 Ap 1957

4 Ormsby H L D mp t G a d n R y n C L Fff ct of ntis n on p m lly d d h p tic k ratiti of r bbit *Am. J Ophth* 34 1687 1692 D 1951

PREVENTION AND CONTROL OF RABIES IN KOREA

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LEE JUNG JAI *D V M*

FOUR soldiers and one civilian employee in Korea were bitten during April 1958 by stray civilian owned rabid dogs which had entered or been near military compounds From May 1957 to May 1958 19 military personnel were bitten by infected animals and a total of nine apprehended dogs were proved by the laboratory to be rabid In all cases the victims received phenolized rabies vaccine without incident

Because rabies is primarily a disease of animals transmissible to man by the bite of an infected animal Veterinary Service of the U S Army performs an integral part in the prevention and control program especially in and around military installations The senior veterinarian assigned to the Eighth Army in Korea functions as a staff member and is advisory to the Surgeon on animal diseases transmissible to man All policies publications and procedures implemented are approved and directed by the Eighth Army Surgeon before any positive action can be taken

In a foreign country it is imperative that close liaison be maintained between the Army Veterinary Service and preventive medicine representatives of the local government in order that the military may be advised of the identity prevalence and location of existing animal diseases transmissible to man

The Veterinary Section of the Livestock Bureau a division of the Ministry of Agriculture in Korea is responsible for animal disease control and the compilation of statistics The information in table 1 assisted military authorities in the formulation of the rabies control program

The number of rabid dogs listed in table 1 should probably be doubled because many animals that die of rabies are not reported or submitted for laboratory diagnosis The civilian dog population in Korea is increasing very rapidly without a corresponding increase in the number of animals vaccinated

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d D P me f V ry M d U y f S I K M j M Ch y
w F R S D g C l f

In addition registration licensing and leashing of animals is not required An increase in the incidence of rabies therefore is to be expected

TABLE I Legislation vaccination and incidence of rabies in Korea [illegible]

Year	Laws		
	Dog population	Number vaccinated	Known rabid
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	-	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

[illegible]

Laws do not require that cases of rabies in humans be reported and therefore the number of human cases cannot be ascertained with certainty It has been unofficially reported by the Chief of the Preventive Medicine Section Ministry of Health Seoul however that at least five persons died of rabies in Korea in 1957 and over 9 000 persons received the anti-rabies treatment

CIVILIAN AND MILITARY CONTROL EFFORTS

In 1950 the Korean government adopted Preventive Law No [illegible] entitled "Animal Infectious Diseases" which recognized rabies as a disease of public health significance This law authorizes the government of each of the six provinces to delegate authority to the police and civilian veterinarians to quarantine animals kill rabies suspects and eliminate stray dogs if deemed necessary Each provincial veterinarian also is responsible for reporting cases to the Veterinary Division Livestock Bureau Ministry of Agriculture

The Korean government maintains two national laboratories which prepare and distribute biologics for domestic use Seoul University and six agricultural colleges offer four year courses with each school graduating about thirty veterinarians annually At present there are 918 practicing licensed veterinarians in Korea for a population of [illegible] 000 000 people

Inasmuch as the military installations are located in and around cities and villages military personnel frequently come in contact with civilian-owned animals both on and off military reservations For this reason it has become increasingly apparent

that the Korean Government must institute an effective rabies control program to eliminate the threat to military personnel To facilitate and encourage such a program the following steps were taken

1 The veterinary section of the Livestock Bureau Ministry of Agriculture was advised by the U S Eighth Army Veterinarian Korea of the number of rabies cases diagnosed by the military The veterinary section agreed to implement a free vaccination and registration system for all privately owned dogs The chief of the Livestock Bureau called a meeting of provincial veterinarians police representatives and military and Office of the Economic Co ordinator veterinarians at which time plans were formulated to vaccinate and register as many civilian owned dogs as possible to ward off a possible epizootic

2 The veterinarian in the Office of the Economic Co ordinator was requested to lend assistance to the Korean Government in an effective rabies control program They responded by donating 13 000 doses of stateside prepared animal vaccine and the National Laboratory in Pusan began preparation of an additional 700 000 ml of vaccine The mass inoculation of animals commenced on 15 May 1958 Each animal owner is given a tag and a registration certificate at the time the dog is vaccinated The program is now in progress and the response of dog owners has been surprisingly good It is hoped that at least 70 per cent of the dogs in Korea will be vaccinated and tagged

3 The Preventive Medicine Section of the Ministry of Health was contacted and it was agreed that whenever the military has knowledge of Korean civilians being bitten or exposed to a rabid animal all the facts pertaining to the incident will be made known to their office so that rabies vaccine can be released for all bitten persons

4 Whenever a rabid dog is apprehended by military personnel in a town or village the police and mayor are contacted so that the information can be publicized locally Any civilian bitten by the rabid dog will be requested by civil authorities to report at once for treatment

To prevent the spread of rabies in animals on Army installations Eighth Army Circular No 40 940, Prevention and Control of Rabies dated 5 March 1958 was published requiring the following protective measures

1 All animal pets except fish and birds maintained on military reservations are to be vaccinated annually registered with the Provost Marshal and must wear a vaccination tag

2 No rodents pets such as chipmunks or rats are allowed as animal pets because they may carry the rabies virus Anyone bitten must take the antirabies treatment if the rodent escapes and is not available for quarantin

3 All strays on a reservation must be picked up by the military police Any animal not wearing a vaccination tag is considered a stray ownerless dog

4 Animals must be kept under the direct control of the owner at all times

5 Any individual bitten is required to report to the nearest medical facility for wound treatment and referred to the antirabies board (This board which consists of a veterinary officer and three medical officers convenes and all factors concerning the case are discussed The veterinarian contributes information to the board concerning the physical condition of the suspected animal the incidence of rabies and an opinion as to whether or not the bitten person should receive the rabies vaccine The animal suspect if available is given a physical examination and is quarantined in isolation kennels for 14 days In the event the suspected animal cannot be found or is showing symptoms of rabies the person must take the rabies vaccine)

Within the Eighth U S Army Korea, one of the major problems is the education of the soldier concerning the danger of rabies To accomplish this precautionary warnings are made on the radio, notices are put in the daily bulletins of each area command, and at staff and commanders' meetings emphasis is placed on the provisions of Circular 40 940, "The Prevention and Control of Rabies " which should be complied with

CASE REPORTS

Case 1 A stray dog wandered into the 76th Engineers compound and was teased by a soldier and a Korean houseboy—both were bitten The Military Police apprehended the animal and brought it to the Veterinary Clinic Physical examination showed the dog to be vicious and clinical symptoms of rabies were present The animal was placed in quarantine and soon showed symptoms of hypersensitivity and a partial posterior paralysis death occurred within 24 hours The Veterinary Officer removed the head packed it in dry ice and sent it by air to the 406th Medical General Laboratory Camp Zama Japan for diagnosis The tests proved positive Both individuals received the antirabic treatment without incident

Case 2 In May 1957 a four month-old pup a company pet on a South Korean air base became rabid and during a three day period bit 14 airmen and one civilian before it was suspected the dog might be rabid The animal died on the fourth day and Negri bodies were found in the brain which are conclusive of rabies All bitten persons received the antirabic treatment without incident

Of interest is the fact that 90 per cent of the persons bitten by rabid dogs were playing with, teasing, chasing examining or otherwise tampering with the animals If military personnel would avoid stray dogs nearly all cases of exposure to rabid animals could be eliminated

AN IMPROVED METHOD OF OBTAINING DONOR BLOOD FOR EXPERIMENTAL HEART LUNG MACHINES

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EDMUND A MASSULLO *Maj USAF (MC)*
THOMAS A SCHULKINS *Capt USAF (MC)*

IN the latter part of 1957 the Surgeon General at the direction of the United States Air Force designated the U S Air Force Cardiovascular Research Center to be set up at this base One of the projects undertaken was the study evaluation development and improvement of various heart lung machines including those in current use that might be used in open cardiac surgery Being a pioneering development in the Air Force many problems were encountered Among initial difficulties were those associated with the collection of blood for priming the heart lung apparatus It was found to be a time consuming process and required several persons to carry out each procedure

At the onset of our experimentations in the use of a heart lung apparatus blood was collected via the femoral arteries of donor dogs This required dissection and cannulation of the vessels It proved to be an uneconomical procedure from the standpoint of time required averaging about 45 minutes per dog Various factors such as clotting within tubing and difficulty in cannulation often further increased the time per procedure We were therefore prompted to devise a different technic for collecting donor blood After experimenting with various methods in an attempt to a certain which was the most satisfactory we were led to adopt an intracardiac route utilizing a table of special design Details are elaborated further on in the text

The advantages of our method are 1 One person can collect the blood 2 No dissection is necessary 3 No surgical operation is involved 4 It has been found possible to decrease the amount of anticoagulant used 5 There is less trauma to blood elements 6 It is less time consuming than other methods 7 It

From the USAF Cardiovascular Research Center at the USAF Hospital Castle AFB Merced California
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can be performed by personnel with minimum amount of training 8 A minimum of equipment is necessary 9 The amount of blood obtained most closely approximates the total calculated blood volume of the particular animal being bled when compared with other methods of obtaining blood

MATERIALS AND METHOD

Items necessary include a needle and syringe containing the anesthetic to be administered intravenously several siliconized, 4½ inch, 13 gage needles graduated plastic container,* and a table Siliconization of the needles has been found to be important from two aspects First, this helps to minimize the trauma to blood elements Second, the number of needle replacements,

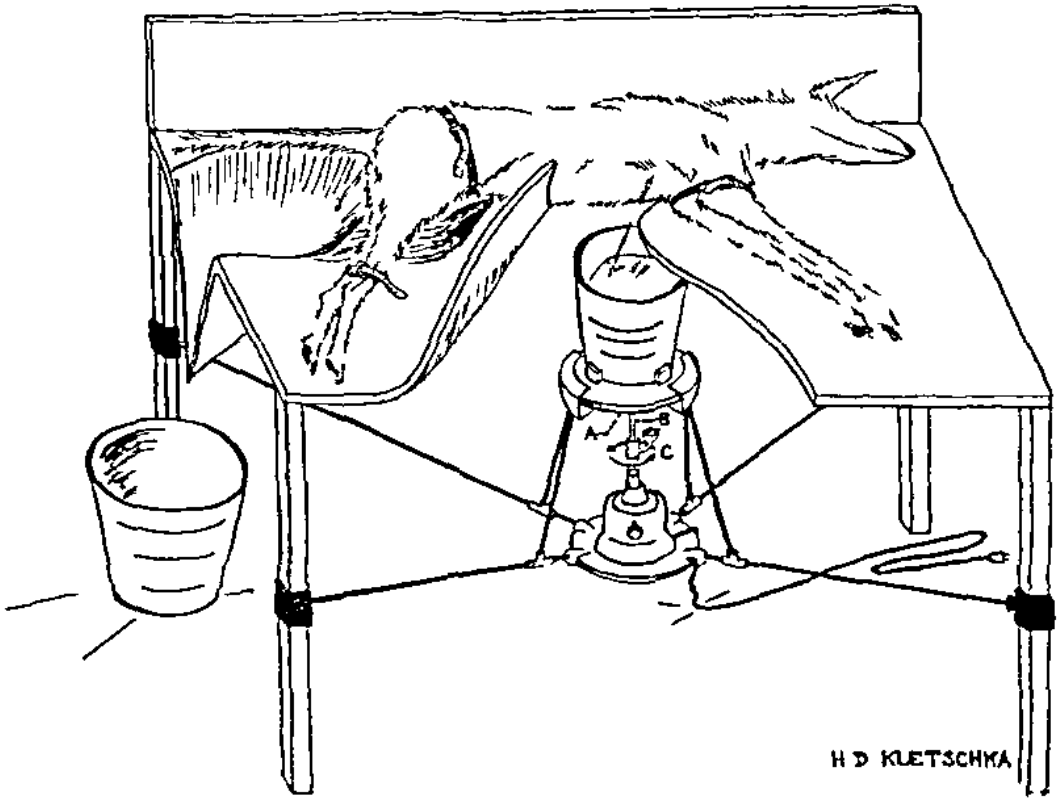


Figure 1 The table in use

necessitated by clotting during the bleeding procedure is reduced The table used for bleeding may be modified according to individual desires For sake of simplicity for experimental tables may be used to hold the dog The tables are identical together with the dog lying on both They are the same except that only the left chest, facing downward is above the receptacle used for collecting the blood For practical advantages however we suggest a table pattern as diagrammatically depicted in figure 1

* Made of polyethyl

In actually carrying out the bleeding procedure the dog is first anesthetized and weighed A gross calculation of the blood volume is then made The animal is placed on its left side on the table and strapped down so that movement during the procedure is prevented The straps for the table illustrated in figure 1 are so constructed that they can be adjusted to accommodate and secure a dog of any size

The amount of anesthetic used for each animal is kept at a minimum Some of course is maintained within the donor animal but an undetermined amount remains in the blood stream and is collected in the pooled blood This is recirculated in the operated animal and its effect may be deleterious to the outcome of the procedure This however applies only to the animal laboratory and need not be considered during clinical use

The point of maximum impulse is palpated in the left chest wall and the 16 gage needle is inserted directly into this area The left ventricle should be entered at this point and a pulsatile stream with bright red blood indicates that the needle is in the proper location The stream is directed into the plastic receptacle which has been appropriately sterilized and contains the heparin used to prevent coagulation

If the stream slows down it may be necessary to insert a clean needle because of clotting within or dislodging of the previously inserted needle It is important that the needle be held steady to decrease trauma and avoid dislodging The needle is kept in place until the maximum amount of blood is obtained This will be obvious by cessation of respirations cessation of flow and absence of heart beat

While blood is being drawn the flask is continuously and gently agitated to promote admixing of blood with the anticoagulant This may be done manually or some type of mechanical device may be used such as that shown in figure 1 After the required amount of blood for priming the heart lung apparatus is obtained it is immediately added to the apparatus and circulated gently

We studied our method comparing it to other technics for obtaining donor blood For this study 72 dogs were utilized The findings are summarized in table 1

From this data it is evident that most complete bleeding occurs with the use of the direct intracardiac method At first glance it is not apparent why a larger yield is obtained by this method than by direct bleeding from the transected descending aorta We believe this is due to the slower exsanguination which occurs when the intracardiac needle is used allowing for peripheral readjustments to occur thereby permitting a continued and more complete

blood return to the heart The exsanguination accompanying tran section of the descending aorta is so acute that these accommo dative mechanisms do not have time to come into play Probably this also accounts for the observation that in attempting to hasten the bleeding using the intracardiac method by applying suction to the needle, the volume yield of blood decreased Although by the transected descending aortic technic, the actual bleeding

TABLE 1 *Comparison of time consumed and yield of blood obtained by various exsanguination methods*

Source of donor blood	Average time consumed (minutes)	Average amount of blood obtained per dog (ml/kg)
Femoral artery	45	65
Descending aorta (complete transection and direct bleeding)	30	50
Intracardiac needle (see text)	20	75

is completed more rapidly, the procedure necessitates a more elaborate surgical setup consists of a more formidable surgical procedure (adding time to the procedure which is not compensated for by the more rapid exsanguination) requires more personnel (in our experience a minimum of three persons), and is technically more difficult to carry out

SUMMARY

An expedient and improved method for obtaining donor blood as used in heart lung machines in the experimental laboratory has been described By use of a specialized table and adopting a method of obtaining blood through an intracardiac route it has been possible to get larger volume yields of blood per animal and to economize on materials time and personnel to a degree unobtainable by other methods Technics findings and advantages are discussed

ACKNOWLEDGMENT We are indebted to Colonel James Hammond USAF (MC) for his encouragement comments and suggestions Captain Helen Wells USAF (NC) who volunteered time and assistance T/Sgt Charles Straub T/Sgt Alan Kershaw A/2C Joseph La Coste and A/3C Thomas Deitch USAF who contributed technical assistance and helpful ideas

REFERENCES

1 Mansilla E. A. Milstchk H. D and Schulkins T. A. Control of hemorrhage occasioned with the use of heart lung machines (Unpublished data)

AN EPIDEMIOLOGICAL STUDY OF AN OUTBREAK OF WATER BORNE DYSENTERY

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DONALD J HERNANDEZ *Capta MSC USA*

IN order to appreciate ome of the problems encountered by U S Forces in Germany one must realize the relationship which exists between the U S Forces and the German State When Germany was entered and occupied as an enemy power certain obligations were imposed upon the various levels of German government One of the e pertained to water supplies In areas where troop concentrations warranted it the German municipalities were required to provide an acceptable water supply according to U S standards This imposed definite requirements on source construction protection and treatment to include chlorination In addition Army personnel were entitled to survey and visit any or all portions of the water supply and distribution systems Thus up to date knowledge was always available about the status of these supplies

However in May of 1955 Western Germany was granted her sovereignty and became part of the NATO family With the granting of sovereignty the status of the U S Forces changed to the position of visitors in an allied nation However the two federal governments agreed that the various municipalities must continue to provide U S installations with potable water Unfortunately no details were set forth as to what constitutes a potable water Thus an issue was created in certain areas due to the German belief that potable water merely means that water must be bacteriologically safe and that protective measures type of treatment and operation are not to be considered as elements in defining water quality

On the basis of this reasoning many communities discontinued chlorination or carried it on in a haphazard manner On the other hand it was the view of the U S Force that it is not sufficient to depend upon the examination of a few bacteriological samples and that source protection and chlorination were still required

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Because of this difference of interpretation, where chlorination was continued it was only continued due to the good working relationship between the local U S Forces and the local municipality This situation also applied to surveys of the systems by military personnel In most instances, the municipalities still permitted sanitary engineers of the medical service to survey the civilian water system, but it was their prerogative to decide what would be done with any recommendations which might be made It must be said, however, that the city officials usually gave such recommendations every consideration, with the exception of recommendations concerning chlorination

The basic difference between American and German opinions hinges on the need for chlorination as a protective measure regardless of the original quality of the water American opinion favors this protection, but Germans feel that water need be chlorinated only if it is proved to be contaminated, and even then they feel it necessary to carry a residual throughout the system In order to improve German American relations, the U S Forces instituted a program designed to provide its own chlorination at all major U S installations The intention was to relieve municipalities of this responsibility as rapidly as was feasible Such was the status at the time of the outbreak

During the period April 23 to May 1, 1956 an outbreak of dysentery occurred at Panzer Kaserne, located at the edge of the city of Boeblingen which contains troop and dependent housing Chief complaints were abdominal cramps and colicky pain of 24 to 36 hours duration followed by diarrhea with 10 to 18 watery stools daily The outbreak involved military personnel and their dependents living in the Panzer Kaserne area dependent school children who lived in other housing areas and attended school at the Kaserne and men assigned to the Kaserne for work but living elsewhere It was interesting to note that the parent of children attending the Panzer Kaserne School but living in [illegible] housing areas did not acquire the disease This incidence distribution showed that the outbreak was confined to personnel working at Panzer Kaserne First notification of [illegible] was received late on April 25 1956 when 65 [illegible]

EPIDEMIOLOGICAL DA[illegible]

Preventive medicine personnel are call[illegible] water borne epidemics at such infrequ[illegible] are few who can claim any great experi[illegible] quently detailed information of such [illegible] ordinary interest The first day 8 mor[illegible] what was diagnosed as gastroenteritis [illegible] 16 and the third day 41 It was a[illegible] were first notified

A preliminary investigation carried out shortly after notification was received revealed sufficient information to cast suspicion upon food or water as being the causative agent Based upon these observations stools and vomitus plus samples of food eaten at previous meals were collected and sent to the laboratory at the U S Army Hospital Bad Cannstatt Good epidemiological evidence could have been supplied by laboratory examinations for a number of infective agents and a study of paired sera It was unfortunate however that the laboratory requests for stool examinations made out by the attending physician requested examination only for ova and parasites not for bacteria or viruses Thus the stool specimens were of little value and as could be expected the results of laboratory examinations were negative Tests for Salmonella type organisms performed on food samples also proved negative

Detailed investigation of the source and distribution of food and milk consumed was accomplished in order to determine the possibility of their being involved in the epidemic In Germany the U S Army provides food shopping facilities through Quartermaster commissaries Each commissary is normally located in a center of population and serves all the American families in that area In the vicinity of Boeblingen there are three commissaries one located in Ludwigsburg and two in Stuttgart Foodstuffs for all three commissaries were broken down at one central point (Osterholz breakdown point Ludwigsburg) and then sent to the various commissaries Dependent personnel living at Panzer Kaserne purchased all foodstuffs from the commissary located at Kelley Barracks Stuttgart This was with the exception of some food purchased in local markets however there was no correlation between these foods or any given food or vendor and the epidemic The Kelley Barracks Commissary also served personnel living in Boeblingen Sindelfingen Kelley Barracks (Stuttgart) Patch Barracks (Stuttgart) and the communities of Vaihingen Sonnenberg and Goehringen (all in the southwest part of Stuttgart)

No cases were reported from any of these other areas with the exception of children who attended school at Panzer Kaserne and personnel who worked at Panzer Kaserne (see figure 1)

The troop rations were broken down at the Seventh U S Army ration breakdown point (Ludwigsburg) with the exception of milk which was broken down at the railhead in Ludwigsburg All Seventh U S Army units located in the Stuttgart area picked up milk and rations from these points and no cases were reported from troop units other than those stationed at Panzer Kaserne Food handling practices in the breakdown method were considered satisfactory and it was felt that they played no part in this outbreal

At the same time that items of subsistence and food handling factors were being checked upon, a study was made of the water supply All water for Panzer Kaserne comes from the municipal supply for the city of Boeblin,,en This supply provides water to approximately 18,400 Germans plus 3 500 U S personnel

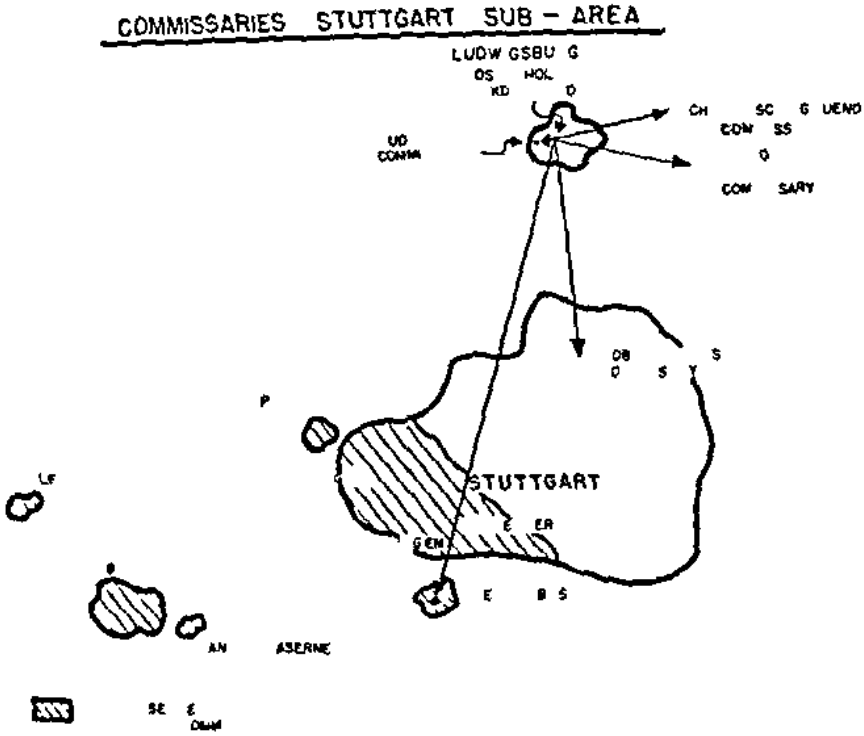


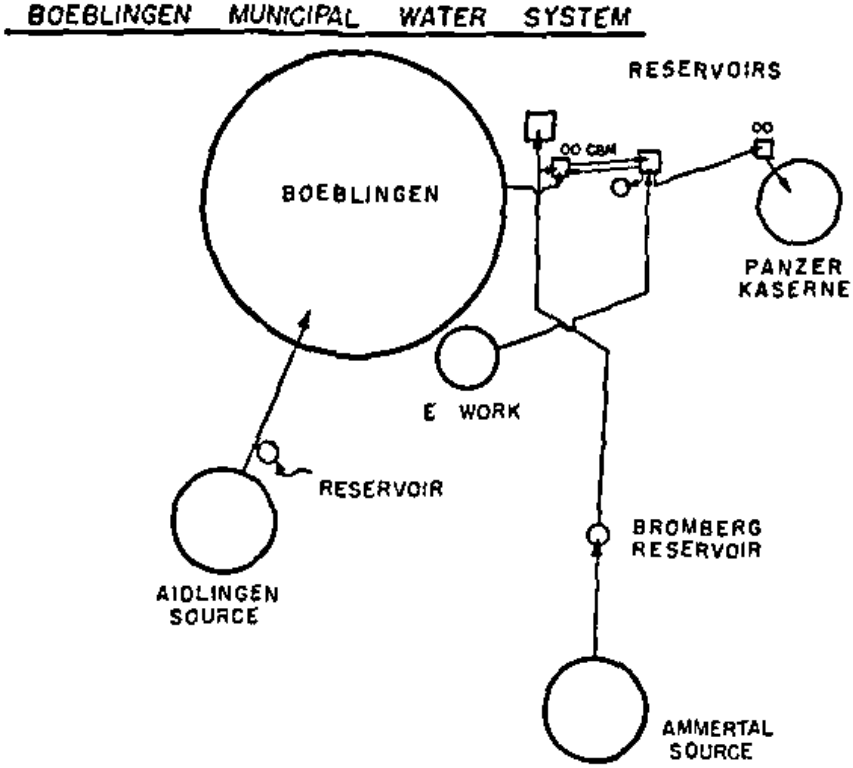
Figure 1 Comm sa y in the Stutiga t a ea and areas served by the Kelley Barracks Commissa y

in Panzer Kaserne There were also approximately 30 U S de pendents living on the economy in the city All water for Boeb lingen is derived from three sources The Aidlingen the E Worl and the Ammertal Schoenbuch Gruppe (relative locations of these sources can be seen in figure 2)

At the time of this outbreak all water received by Panzer kaserne was coming from the E Work source For that reason, the investigation centered around this source and its distribution system However the other sources were also surveyed and no conditions were found which would implicate them in the outbreak under consideration Water for the E Work is derived from a well a series of springs, and an infiltration gallery, all of which are located on the southeast edge of Boeblingen

Water from all springs flows to the infiltration gallery, which is approximately 2o0 meters lon,,, 6 meters deep, and constructed of 300 mm diameter perforated clay pipe Located at 50 meter intervals are six inspection shafts and all water from the springs flows through the gallery to the final inspection shaft From this shaft the water flows by gravity to a 600 cubic meter reser

voir located under the E Worl pump station from which it is normally pumped to a 1 200 cubic meter reservoir serving the Panzer Kaserne area of Boeblingen (see figure 3) The well water is pumped directly to the 600 cubic meter reservoir and



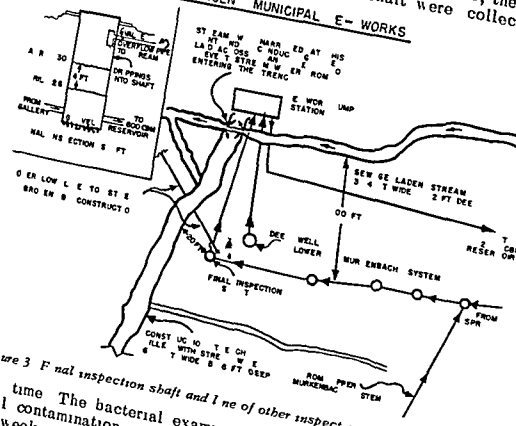
Figur 2 Boebl g m pal wate ur s a d

does not enter the final inspection shaft There are three lines entering the final inspection shaft one brings water from the springs and the gallery one takes the water to the 600 cubic meter reservoir the third which is valved acts as an overflow in the event of a high water table

In the course of the inspection on April 26 1956 it was found that approximately 20 feet from the shaft a trench had been dug for the installation of a water line from the Aidlingen water source to the E Work reservoir and that during the digging of this trench the overflow pipe had been cut and a section removed The construction trench intersected a stream which was heavily laden with sewage This stream was located parallel to and approximately 100 feet from the infiltration gallery and the stream water had flowed into the trench (see figure 4)

At the time of the visit the broken end of the overflow pipe was partially submerged in the trench water and obvious liquid flow was noted dripping into the shaft from around the overflow pipe where it entered the shaft (see figure 5) The water level in the construction trench was found to be at a higher elevation than the invert of the overflow line where it left the inspection shaft The ground in the area was apparently saturated with

sewage and the trench water was probably flowing along the outside of the overflow pipe rather than entering through the closed overflow valve Samples of the trench water, the shaft water, and the water dripping into the shaft were collected at



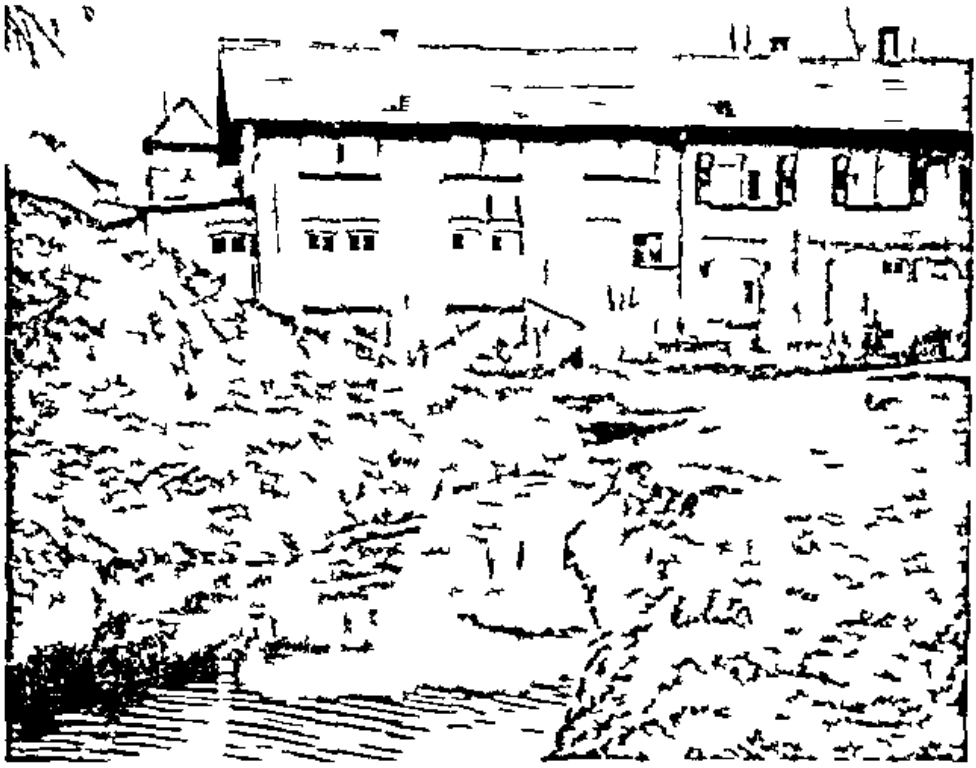
F gure 3 F nal inspection shaft and I ne of other inspect on shafts on galle y

this time The bacterial examination showed evidence of cross fecal contamination in all three waters Owing to rainfall during the week prior to April 22 the water level in the trench had at one time completely submerged the broken end of the over flow pipe This conclusion was based upon a well established high water line on the side of the trench

The E Work well is located on the same side of the stream as the infiltration gallery but is approximately 70 feet from the stream Water is pumped from the well directly to the 600 cubic meter reservoir beneath the pump station Samples of this water, which were collected for bacteriological analysis were negative for coliform organisms

Chlorination at the E Worl was accomplished by a manually controlled gas solution feed 400 gm/hr chlorinator On April 26, chlorine was being fed at a rate of approximately 2 2 ppm and the free chlorine residual at the plant was 2 0 ppm No scales were provided for weighing the chlorine and the cylinder is changed only when the cylinder pressure falls by reason of com plete exhaustion of the contents Municipal officials agreed to increase the chlorine dosage to approximately 3 5 ppm which

is the maximum capacity of the chlorinator No records pertaining to chlorination were maintained at this pump station Such records could have been of considerable value in this instance as it was believed that on the actual days of outbreak (April



F gur 4. N uly x a at d A dl g i h w th E Work b kgr d.

21 22 1956) the flow of contaminated water into the inspection shaft could have been such as to create a chlorine demand in excess of the chlorine dosages

The plausibility of this theory was confirmed on April 30 19 6 on this date chlorine was being fed at a rate of 3 5 ppm The free chlorine residual at a point shortly following the point of dosage (approximately 2 seconds later) was 1 0 ppm indicating an immediate high chlorine demand and there was no detectable residual when the water arrived at the 1 200 cubic meter reservoir serving the Panzer Kaserne area (approximately 44 minutes later) Rain had fallen for several days before April 30 lending further credence to the hypothesis that heavy contamination of the E Work source occurred under very similar circumstances about April 21 or 22

On April 30 the end of the overflow pipe was again partially submerged a much heavier flow was noted seeping into the final inspection haft and the water level in this shaft was four feet higher than on April 26 1956 At this time the Boeblingen municipal official in consideration of these facts agreed to discontinue the u e of the E Work source On May 1 1956 Panzer

Kaserne started to receive water from the Ammertal Schoenbuch Gruppe and also from the Aidlingen source

Prior to this outbreak, when the water arrived at the 1,200 cubic meter reservoir, it was rechlorinated by personnel working for the local Army Area Engineer Office Chlorination facilities

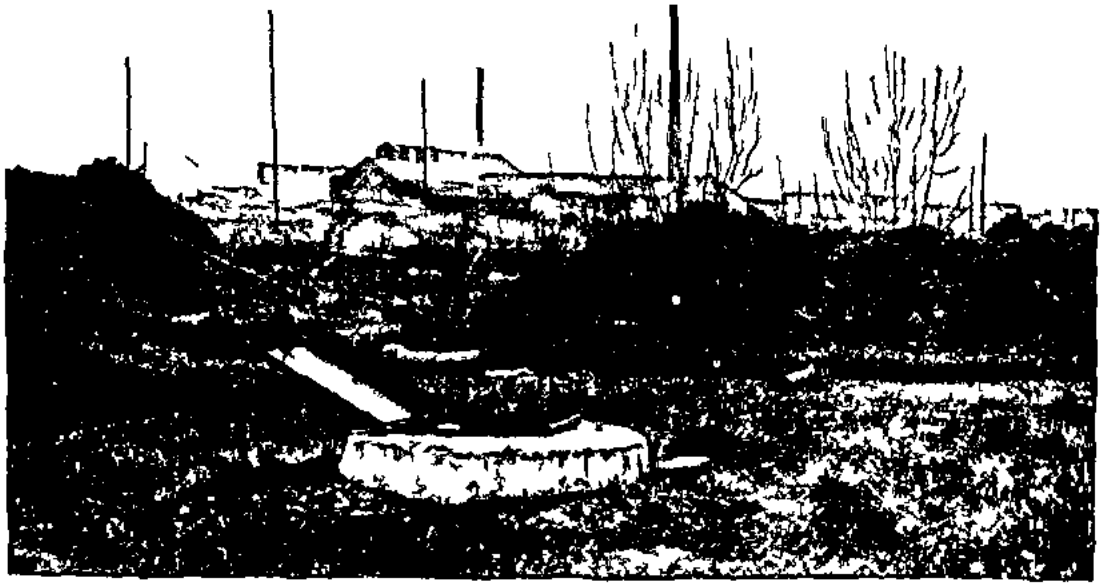


Fig re 5 Final inspection shaft whe e sewage entered the system

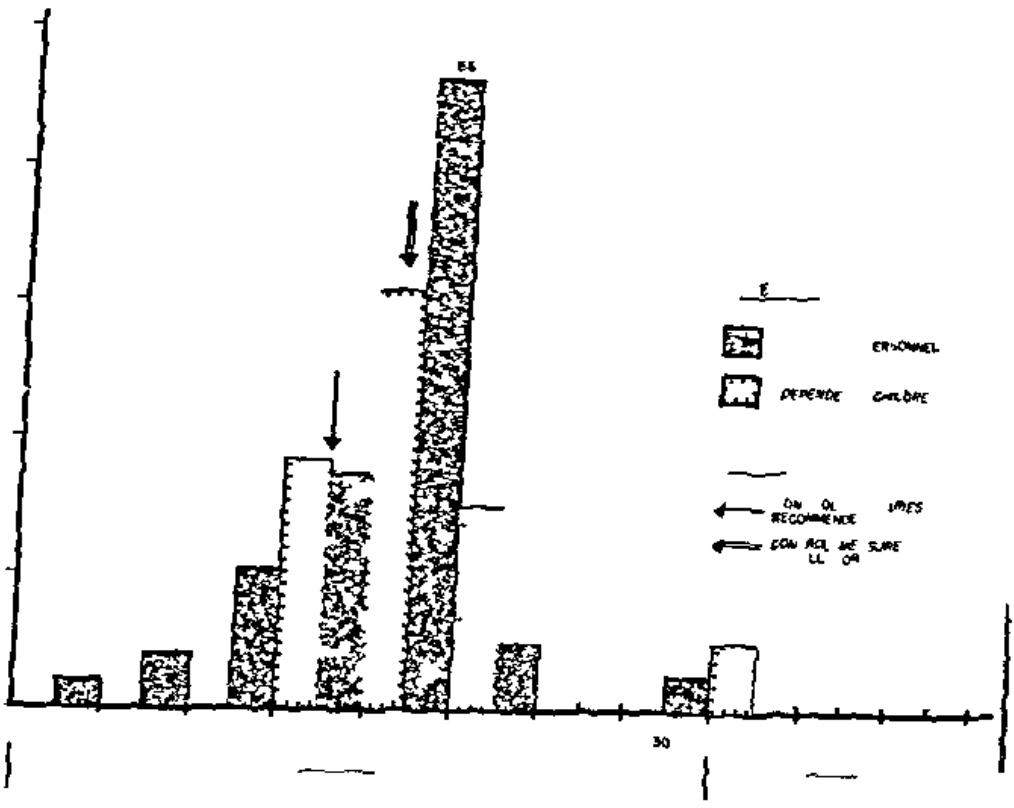
consisted of two dripcrocks which were normally operated between the hours of 0830 and 2100 and not operated at all on Sundays or holidays These crocks dripped a 300 ppm chlorine solution into the reservoir at a rate which the operator "thought" was about right, but no attempt was made to verify this "thought" On Saturday, April 21, 1956 chlorination stopped at approximately 1545 hours when the feed solution ran out, and was not reconstituted until approximately 0930 hours, Monday, April [illegible] No records pertaining to chlorination were maintained at the chlorination point Of the 1 600 cubic meters of water used daily at this reservoir approximately 1,200 cubic meters went to Panzer Kaserne and 400 cubic meters went to [illegible] lingen in the same general area From the reservoir at Panzer Kaserne water is pumped to a 300 cubic meter elevated tank at Panzer Kaserne from which there is a gravity flow to the [illegible] system

STATISTICAL DATA

The total number of cases involved in the outbreak included 346 military personnel 321 non-military adults and 238 dependent children attending [illegible] The peak for military personnel was reached on April 19 during which 186 cases were reported (fig [illegible]

The peak for dependents and dependent children was the same as for the military person[illegible]

incubation period of the disease Of the total military cases six were hospitalized with signs of dehydration and appearance of blood and mucus in their stools A slight rise in temperature



6. Daily d c of dy e tery f m litary p m l and hool ag h ld

was noted in 50 per cent (99 to 100 F) but the most common complaint was abdominal pain and loose watery stools (figure 7)

BACTERIOLOGICAL DATA

It was interesting to note that no cases were reported among the German population using water from the E Works source It is believed that this was due to the following factors A smaller population was exposed less water is consumed by German civilians for drinking purposes such individuals may have a higher acquired immunity to the disease agent involved and mild cases of diarrhea are not considered important enough to report or to seek medical attention Diarrhea is not a reportable illness in Germany and no systematic search was made for for civilian cases at the time of the outbreak described

A call made to the 4th Medical Laboratory Landstuhl Army Medical Center for laboratory assistance was met with prompt action The mobile laboratory with two laboratory officers and three clinicians arrived at Panzer Kaserne within 48 hours and immediately et up shop Rectal swabs were taken on all acute

or convalescent cases and blood was taken from the more seriously ill patients for research and studies Analysis of the swabs revealed no enteric pathogens and the research studies did not

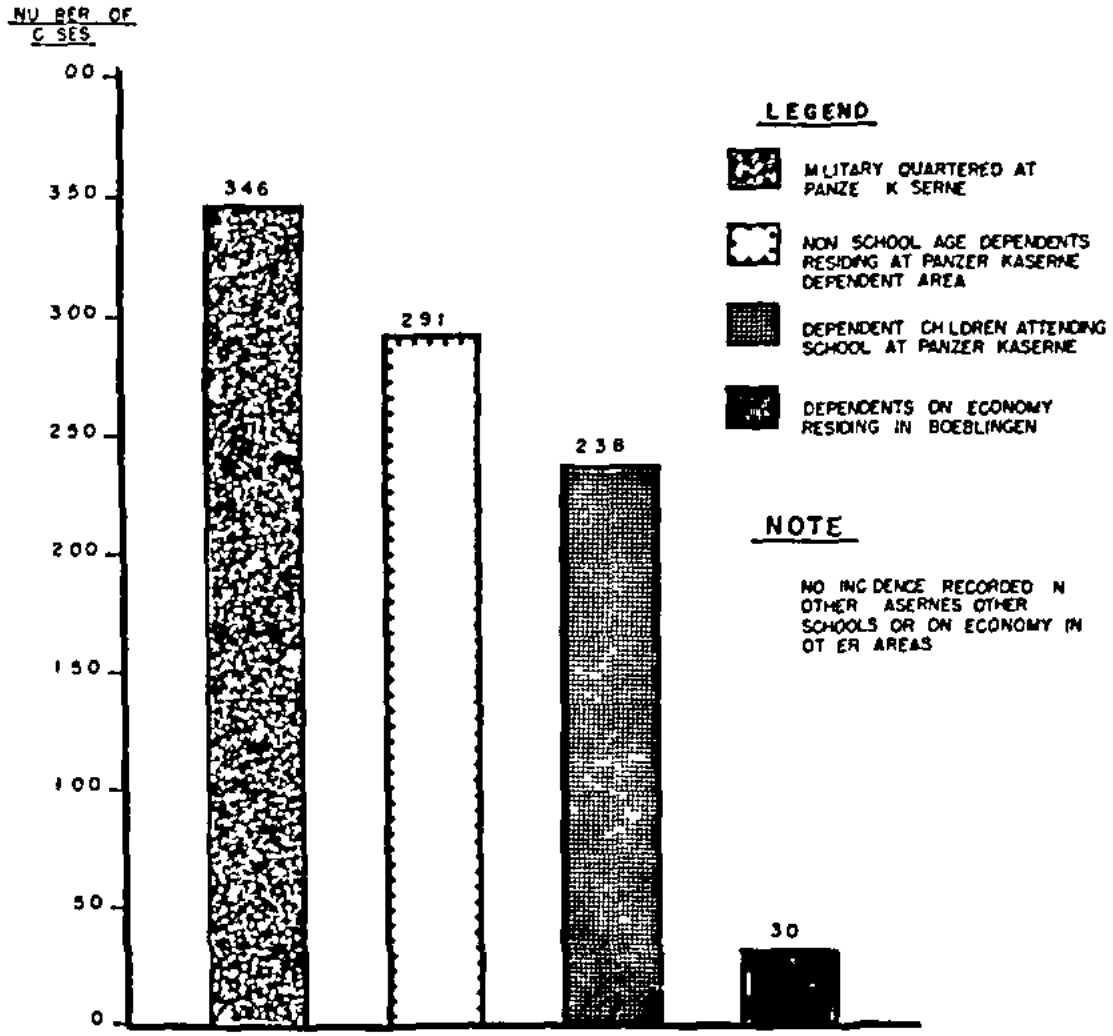


Fig e 7 Compa ative incid nce of dysente y

shed any new light All patients recovered uneventfully No cases of viral hepatitis occurred, although it was feared that that this might be a secondary complication

Samples of water that were taken from the E Works for bacterio logical analysis showed evidence of gross fecal contamination as shown in table 1

As can be seen, the water supply was heavily contaminated Gas production ranged from 25 to 60 per cent in 24 hours and from 30 to 95 per cent in 48 hours This further pinpointed the sources of the outbreak at the E Works water source

It is interesting to note the pattern which occurred later at the well and the final inspection shaft The well showed con tamination only once whereas the shaft continued to show inter mittent contamination In all probability, the ground around the

TABLE 1

D t	L t o	R lt		
4/26/56	E W k	F l pecti h ft	All po it po t	E l
		D pp g to f l p t h ft	All p t p t d A b t	E l
		T h dj c t to f l p t h ft	All po t po	E l
4/27/56		F l p t h ft		
		D pp g o h ft	All p t p t d A b t	E l
		D pp g f l p tion h f	All p t p t d A b t	E l
4/30/56		F l p t h ft	All po t p t	E l
		D pp g t f l p t on sh f		
		W ll	N p t p t	
7/12/56		W ll	O po po t	E c l
		F l p t h ft	All p it po t	E l
7/13/56		F l in p t h ft		
7/19/56		W ll	N po t p t	
		Fin l p ct h f		
7/24/56		W ll		
		F l p ti h ft		
7/25/56		W ll	All p t p t	E c l
7/31/56		F l p t h ft	N po t port	
		W ll		
8/1/56		W ll		
		F l t p t h ft		
8/2/56		W ll		
		F l p t h f		
8/9/56		W ll		
		Fin l p t o h ft	All po t po t	E c l
8/16/56		W ll	N p t p	
		F l in p t h ft	All p p t	E l

shaft had become so saturated with the grossly contaminated trench water that four months later it still yielded polluted water Although not included in this report, later samples were collected and intermittent contamination was still being picked up a year later Once an area is saturated as it was in this instance, it is extremely difficult to tell how long it will take before all the contamination is leached out

CONTROL MEASURES

As soon as it became evident that the Kaserne water supply was the causative agent of the outbreak the following control measures were instituted

1 All water for drinking or cooking purposes in dependent areas was boiled for a minimum of one minute

2 Lyster bags with adequately chlorinated water were located throughout the Kaserne

3 Individual water disinfection was instituted utilizing canteens and water purification tablets All men were required to wear their canteens filled with treated water while in the field or at work

4 All individuals exhibiting symptoms no matter how mild were encouraged to attend sick call

5 All food handlers with diarrhea were temporarily excused from performing their normal duties

6 A search was made for the detection of possible carriers

The application of control measures by the troops was initially hampered by the fact that troop units had quantities of obsolete supplies for water treatment and did not have adequate supplies of calcium hypochlorite ampules Personnel also displayed a lack of knowledge about proper use of water treatment chemicals However adequate supplies were soon made available and the program proceeded in an excellent manner Once the control program was in effect no new cases were reported

COOPERATION WITH GERMAN PUBLIC HEALTH AUTHORITIES

The cooperation between U S Army and German health officials was excellent, once the German officials were convinced that the dysentery outbreak was due to contaminated water from the E Works German health authorities declared the water at this source nonpotable and directed that its use be discontinued As an interim measure water from the Ammertal Schoenbuch Gruppe and from the Aidlingen source was then provided to the Kaserne

The Ammertal Schoenbuch Gruppe water was not chlorinated, so that the resulting mixed water had a negligible chlorine residual This water was therefore rechlorinated (at a dosage of

2 0 ppm) at the 1 200 cubic meter reservoir on a 24 hour basis utilizing the existing drip crocks In addition emergency water discipline at the Kaserne and dependent housing area was still maintained

DISCUSSION

During the course of this investigation a number of instances were noted where extremely poor judgment was exercised and poor procedures were in use Among these may be noted the following

1 Municipal engineering personnel realized that they were working in a water supply area and still did not observe good engineering practices when they excavated the trench This permitted the cutting of the overflow line and flooding by the sewage laden stream Even after this happened no attempt was made to correct the situation In fact they stated their intention of leaving the sewage laden water in the trench until after the new water line had been laid in order to detect line leaks by the air bubbles which would rise to the surface This was actually permitted and as a result the new line was contaminated The proper procedure for detecting leaks in new mains is to test the mains at high water pressures and visibly note where leakage occurs When changes or repairs are made on a water works they must be made with the greatest of caution If they are not they can be made in such a way as to endanger gravely the lives of personnel using the system

2 No attempt was made to maintain records on chlorination Thus it was impossible to obtain any accurate information about chlorine dosage chlorine residuals or chlorinator failures This is extremely poor procedure which not only results in a lacl of reliable information but also encourages careless operation

3 Haphazard booster chlorination was practiced at the1 200 cubic meter reservoir with no chlorination accomplished on Sundays and holidays and no records of any kind kept When a chlorination station is operated it should be operated in such a manner that records are maintained as to the amount of chlorine fed the amount of water treated and when treatment is carried out including comments on any unusual occurrences Without these data the chlorination is done haphazardly and gives a false sense of security

4 As set forth in pertinent regulations appropriate military personnel were responsible for making daily determinations of chlorine residuals at points of usage and for making at least weekly checks of chlorine dosage at all chlorination points However no chlorine residual checks were made on Sundays

or holidays and no checks were made on chlorine dosages The lack of Sunday and holiday checks left a gap which was especially significant on April 22, one of the critical days of the outbreak Had weekly dosage checks been made and had proper liaison been established with municipal personnel, the cause of this outbreak might have been detected sooner and the outbreak possibly averted

5 Many troop units at Panzer Kaserne had on hand inadequate and/or obsolete supplies for use in water treatment Personnel also displayed a lack of knowledge as to the proper use of the appropriate items Therefore, the institution of water discipline was initially hampered Since that time, Quartermaster sections have called in all supplies of obsolete items and have replaced them with the correct items

CONCLUSIONS

This outbreal was caused by sewage laden water entering the final inspection shaft at the Lower Murkenbach (E Works) system In all probability either the quantity of contamination was so great as to utilize completely the chlorine being fed at the E Works or there was a chlorination failure at the E Works at the time in question Approximately a week later the first mentioned situation did exist and in all probability existed at the time of the outbreak The second situation is only presented as a possibility in view of the fact that no records were available to show otherwise If the booster chlorinators at the 1 200 cubic meter reservoir had been functioning, there is a possibility that the outbreak could have been averted The event is proof that such outbreaks do occur despite the often repeated phrase We have been operating for years and have never had any trouble

Water borne outbreaks of this type are relatively rare today and because of this fact, many personnel in and out of the water works and public health field have acquired a complacent attitude concerning the precautions which must be taken if such outbreaks are to be prevented This epidemic could have been much more serious than it was for example had the causative agents of typhoid fever or infectious hepatitis been present It is hoped that the report of this outbreak will serve to identify a number of physical deficiencies in water works practice which should be avoided that it will act as a warning, to eliminate complacency and that it will alert personnel to their responsibilities

ACKNOWLEDGMENT The authors wish to express appreciation for the advice and guidance furnished by Colonel Adam J Papalski MC USA and Lt Colonel Robert McCall MSC, USA Medical Division Headquarters U S Army Europe in the investigation of this outbreak

UNILATERAL TOTAL LUNG CAPACITIES IN THE LATERAL DECUBITUS POSITIONS

DONALD C. KENT *Comm d MC USN*
ROCCO D MASELLA *M D*
ARTHUR A SIEBENS *M D*

TURNING a patient onto his side alters the *contributions* of the two lungs to respiration This observation is virtually as old as bronchospirometry it elf and has been repeatedly confirmed [1-6] The dependent lung shows a relative increase in oxygen uptake greater "efficiency of respiration as judged by a fall in the ventilatory equivalent and changes *in the subdivisions of the vital capacity*

Roentgenograms of the chest taken with the patient in decubitus positions suggest that the end expiratory volumes or functional residual capacities of the two lungs also must undergo extensive changes Measuring the magnitude of these is the *primary objective of the present study*

METHODS

Four patients were selected on the basis of the following 1 Vital capacity and maximum breathing capacity were more than 90 per cent of the predicted value 2 The distribution of the vital capacity *when the patient lay in the supine position* was normal (right lung 50-60 per cent of total) 3 Fluoroscopy indicated unimpaired motion of the diaphragm 4 There was no extensive pleural disease 5 The measurement of functional residual capacity when the patient was in the decubitus position was acceptable As criterion of this latter qualification the sum of the functional residual capacities of the two lungs in the decubitus position was required to check within 12 per cent of the standard bilateral measurement made with the patient in the supine position These patients therefore had unrestricted diaphragm and chest walls and probably had reasonable values for the functional residual capacity of each lung

Bronchospirometry was performed under topical anesthesia with a Carlen s tube (a flexible double-lumen catheter) placed

F m h Ca d pulmo ary L b ry U S N I H p l St. Alb N Y d th D p rtm f Phy l gy U y f N w Y rk Coll g f M d m N w Y k C y *Brooklyn, Comdr* K w *ig d* U S N I H p l B b g M.

Th P l ct d d by b tm h *Oil* f N I R h D p rt m f h N y d h St l f Y rk

fluoroscopically The patient was turned to either right or left lateral comfortable decubitus position, and given time to restore a stable respiratory pattern Units for measuring the unilateral functional residual capacity by nitrogen washout were then attached to each lumen of the catheter and the patient allowed to breathe into these for nine minutes At the end of this time, samples of alveolar gas were collected from each lung, the catheter was coupled to spirometers, and standard bronchospirometric measurements were made with the patient in the decubitus and supine positions The entire bronchospirometric routine took about 20 minutes to complete The method of measuring the functional residual capacity of each lung is described in greater detail elsewhere [7]

With the patient in the sitting position, maximum breathing capacities were performed by having him breathe through a low resistance valve into a Douglas bag The bilateral vital capacity and its subdivisions were measured in the supine position The open circuit technic of Darling, Cournand, and Richards[8] was used in measuring the conventional functional residual capacity the values tabulated are the mean of two measurements which checked within 10 per cent All lung volumes were expressed at BTPS

RESULTS

The functional residual capacity of the lung on the side on which the patient lay was always reduced and of the opposite lung was always increased The redistribution of this volume was such that the left lung contained as little as 36 per cent of the volume of the right lung or 26 per cent of the total functional residual capacity, when the patient lay on his left side and the right lung contained 62 per cent of the volume in the left lung or 38 per cent of the total, when the patient lay on his right side The basis of these figures is tabulated in tables 1 and 2 and is shown in figure 1

For purposes of summarizing the effects of position on volumetric compartments the proportionate distributions (table 2) of the various compartments in the decubitus and supine positions were compared It was assumed that supine residual volume and functional residual capacity were distributed as was supine vital capacity, the basis of this assumption being measurements of unilateral total lung capacities in persons with minimal pulmonary lesions The figures which follow apply to the inferior lung, identical figures of opposite sign applying to the contralateral or superior lung

The proportion of the *functional residual capacity* decreased in each instance, the range being 6 per cent to 20 per cent and the mean 13 6 per cent The proportion of the *residual volume* was virtually unchanged in two patients (−5 per cent and +4 per cent) and fell 20 per cent and 26 per cent in the other two The

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F m h C d pulm y L b ty U S N l H pa l S Alb N Y d h D p rtm f Phy l gy S U y f N w Y k Coll g f M d m N w Y k C y B klyn. Comd K w g d L S N l H p l B b dg Md

Th p) d d b b w th Off f N l R h D p m f th N d h S U y f N Y k

proportion of the *vital capacity* changed 6 per cent or less in three patients and fell 17 per cent in one patient Although the proportion of the *total lung capacity* fell in each instance, the magnitude of this fall was 3 per cent or less The proportion of the *expiratory reserve* fell in each patient, the range being 7 per cent to 32 per cent and the mean 16 2 per cent The *inspi*

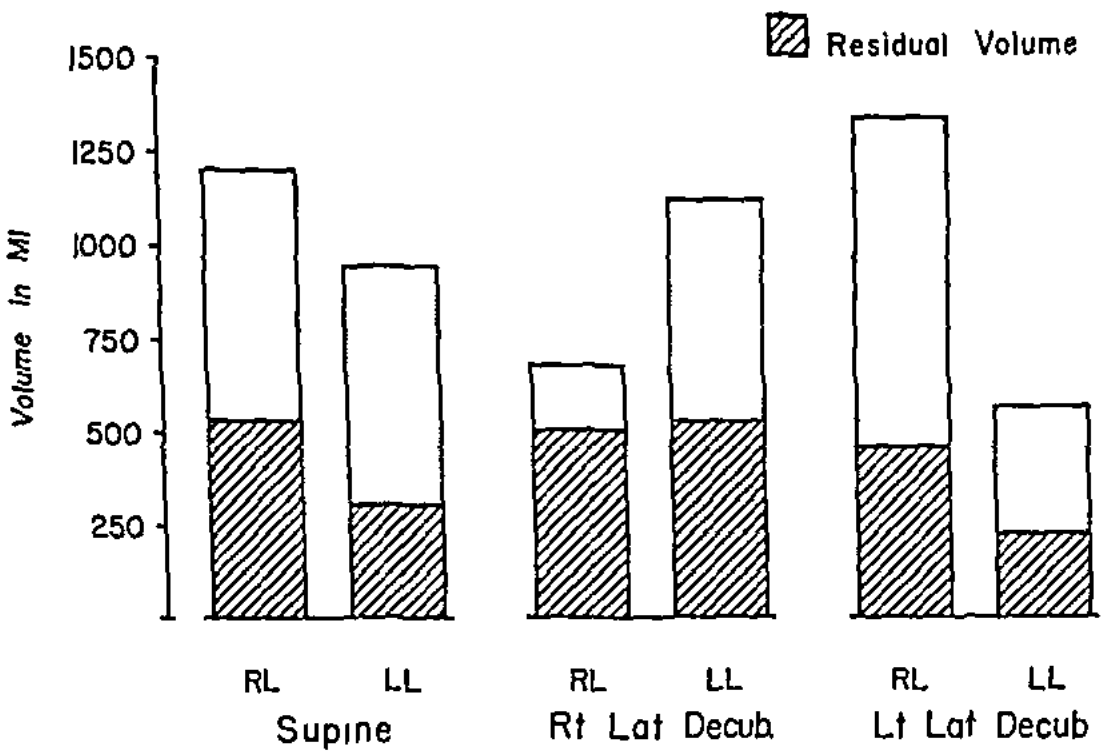


Figure 1 Unilateral functional residual capacities and residual volumes in three subjects lying in different positions Supine volumes are those of patient No. 0523 in a previous publication Values for right and left lateral decubitus positions are those of patients 1 and 4 in the present report

ratory capacity increased from 5 per cent to 13 per cent in three patients and fell 10 per cent in one Figure 2 illustrates the changes in the distribution of these volumetric compartments in one patient

DISCUSSION

When a patient is turned onto his side, the end expiratory volume of the ipsilateral lung is considerably reduced Logic would lead one to anticipate such an effect, and roentgenography clearly indicates its basis There is a cephalad displacement of the inferior diaphragm and a caudad displacement of the superior diaphragm These changes affect not only the end expiratory volumes of the two lungs (fig 1) but their inspiratory and expiratory volumes as well (fig 2) When the supine person is rotated along his longitudinal axis, therefore, gravity affects the subdivisions of the total capacity of each lung predictably Rotation along a transverse axis also affects lung volumes by changing the position of the diaphragms [3] these well known

side and thick purulent material escaped after penetration of about 2½ cm below the cortical surface Fifteen milliliters of material were aspirated The specimen was dark and had a fecal odor Further aspiration resulted in soft necrotic brain material being removed with some blood There was no sensation of passing through a capsule A cannula was placed in the right ventricle and clear fluid was obtained Cannulas were left in place bilaterally Intensive antibiotic therapy was instituted promptly after the surgical procedure when the stained smear from the abscess showed streptococci The patient was started on 30 million units of aqueous penicillin intravenously 1 gram of streptomycin sulfate and 1 gram of chloramphenicol intramuscularly every six hours At this time the white blood cell count was 16 000 per μl with 77 per cent neutrophils 21 per cent lymphocytes and 2 per cent eosinophils

On the ninth hospital day the patient was completely comatose A ventriculogram showed a shift of the ventricles from left to right The neurosurgeon then performed a temporoparietal craniotomy Aspiration through the dura in several directions revealed no pus The patient was decompressed but the dura was not opened Bacteriologic studies from the material obtained the day before revealed that the streptococci were anaerobic in character Blood cultures again showed no growth The antibiotics were continued as before

On the tenth hospital day the patient stopped breathing and was put in a respirator His pulse rate remained near 60 The maximum temperature was 101 2 F rectally Hypotension developed and a vasopressor was started intravenously The patient remained totally unresponsive The pupils were dilated and fixed, with the right being larger Some blurring of the right disk margin was seen Further bacteriologic studies revealed that the anaerobic streptococci were sensitive to erythromycin penicillin and chloramphenicol in that order Two grams of erythromycin intravenously every six hours was added to the other antibiotic therapy On the eleventh hospital day the patient s blood pressure became unobtainable and he died quietly

DISCUSSION

D t J g At this time I should like to ask Dr Pollard to comment generally on this case to tell us what we did that was wrong in handling the patient and to speculate on what Dr Blanchard will reveal from the autopsy

D t P ll d This patient up until the moment before pus was found probably had been suspected of having a brain tumor The onset of convuls ons at age 39 would make him a brain tumor suspect His headache sensory phenomena and motor phenomena including f ts ll contain clues that would b helpful in the clin cal evaluation of

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p L w W P ll d USAF (MC) b f nal m d

a patient with a similar problem This condition could have been a cerebrovascular accident Its suddenness of onset would rather favor hemorrhage over thrombosis This could have been a subdural hematoma lead poisoning with encephalitis tuberculoma, or a gumma There was a past history of positive serologic tests but if this had been a gumma one would have expected the spinal fluid to be positive for syphilis There is no need to discuss these possibilities any further

It is interesting that a patient with such an extensive lesion of the parietal lobe would have had sensory findings elicited only on the double simultaneous stimulation examination Of course this was noted soon after admission when there may have been a small focus of infection As far as I have been able to learn, the technic of double simultaneous stimulation was first described by Bender[1] in 1945 The technic is one of stroking or touching the blindfolded patient with unaided fingers on widely separated areas simultaneously in a quiet room In a later series Bender, Shapiro and Schappell[2] found that 44 out of 50 hemiplegic patients had partial or complete extinction of sensation on the injured side Interestingly enough only 29 of these had sensory deficits when tested by the routine single stimulus technic In a later study of 400 people with cerebral difficulty, Bender Fink and Green[3] found reproducible differences between stimulation of a cheek and stimulation of the dorsum of the contralateral hand They found that in normal people from age 7 to 60 years, 97 per cent correctly identify both stimuli on the first trial A small percentage of older and younger people have the ability to perceive the simultaneous stimuli

Discomfort on the right side of the head was a [illegible] this patient had following admission Wolff[4] found [illegible] of intracranial structures were pain-sensitive [illegible] great vessels including the connecting branches [illegible] major venous sinuses The second group included [illegible] 9 and 10 and the upper three cervical [illegible] tients with localized solitary expanding [illegible] found that the site of the headache was [illegible] location of the tumor or expanding [illegible] series In a select group, however, [illegible] a group with supratentorial headache [illegible] this patient did meet these [illegible] and the pathologic lesion was [illegible] phenomena including his recent [illegible] type progression starting [illegible] pital day were a dramatic [illegible] Thus the seizures pointed [illegible] brain abscess was found

Now let us speculate [illegible] in the protocol does not [illegible] primary foci for [illegible] groups The [illegible] as the primary [illegible]

ear and 10 per cent come f om the nose and nasal sinuses Twenty *per cent come f om localized infection elsewhere particularly the* lung and heart Trauma w th direct brain injury inoculat on account for another 5 per cent Miscell neous infection and unknown s tes make up the em in ng 15 per cent

Ascending and descending in aircraft as this m n did in flying is often effect ve in bringing latent infections n the ears and s nuse to cl nical attenti For this r ason plu the n gative physical exam n tion I am bypa sing the e as p ssible sources of infection Special oentgenograms of the teeth and sinuses m y have pointed to a site but we do n t have this information Thus I do not know how the br in abscess originated

Th e question of what to do was p ed by finding an obic strept cocci in the brain abscess Anaer b c streptococci e often present in the mouth nasopha ynx and sinu es f healthy peopl It is a common nhabit nt of the vagina Ordin rily they become vicious crimin ls o ly under ana robic conditi ns These c nditions a e met in the post partum uterus in the lungs following pulmon ry inf rct on in the paranasal sinuse n th brain and after human b tes Many stra ns are penic llin resi tant but thi is n t an ab olute resi t nce Th method of tre tment is gen rally with intensive dos s of pen cil lin This was done as the pat nt re eived almost 100 m llion un ts daily n add tion to th oth antib otic Thi patient certa nly had a resi tant train

It is xpect d th t the infection would h ve a sp eading tendency One of th ch racteristics which mad the st eptococci so clinically import nt are the enzymes and substance that the living streptococ produce p rticul rly pre ding f ctors such as hyaluron dase It would not be surprising then th t this absce s wa not w ll enc psu lated

In conclus on I believe that the patient xpired from the p ogre ive ab cess extens on through the brain substance Rupture into the v ntricles or into the cer brospinal spaces w th m ningitis and a focus for metastatic inf ction may be found Dr Blanchard may sh w a focus in th heart or lungs which was not d scov red linically A more likely primary source of infection in my opinion however w uld be an asymptomatic apical abscess of a tooth Bacteremia may h ve occurred during chewing The tooth could move up and down i the tooth pulp like a piston each time f rcing another little fragm nt of this ap cal abscess material into the blo d stream The brain abs cess could follow Now let me hear wh t really happ ned

D t J ig *Dr Pollard first let me ask you a few quest ons* The antibiotics did not eem to help What el e might have been done that would h ve chang d the utcome of thi case? And what do you think about the ab ence of fever for t least six days during the de velopm nt of the ab ce ?

D t P ll d The patie t pparently d d not have a local instil l ti n of ntib t cs Ea ly and th ough drain ge of br abscesses

combined with appropriate antibiotic and supportive care may be effective treatment I refer you to the British literature for some excellent work in this area [5] Even so all patients cannot be saved It is still a very serious disease After the infection is controlled many patients have marked disability from residual brain damage

Fever frequently is not present in patients with brain abscesses This is an interesting clinical fact that may delay early therapy At least one clinician[6] has emphasized the absence of fever or even hypothermia when associated with bradycardia as a sign suggesting brain abscess

Doctor Jernigan Dr Blanchard the primary question now is where did this brain abscess originate? We would like to hear your autopsy report

PATHOLOGIC FINDINGS

Doctor Blanchard The autopsy was performed approximately 14 hours following death The body was that of a well developed well nourished white man who appeared the stated age of 39 years He measured 180 5 cm in length and was estimated to weigh 180 pounds

Upon removal of a surgical dressing from the scalp an 11 cm surgical incision was noted just anterior to the left ear and 3 cm surgical incisions were noted bilaterally over the posterior parietal regions of the skull Cannulas were protruding from the posterior incisions The scalp was markedly edematous measuring 15 to 20 mm in thickness

The brain weighed 1 600 grams and was soft in consistency The veins over the left cerebral hemisphere were dilated There was an area of localized meningitis over the parietal lobe of the left cerebral hemisphere The meninges otherwise were not remarkable The gyri were broadened Multiple sections through the brain revealed an area of suppuration in the left parietal lobe that extended from the insula to the thalamus (fig 2) The cavity was superior and lateral to the ventricle which was displaced medially and inferiorly The abscess contained a small amount of purulent material and the lining was irregular and brownish red in color Culture of the material grew anaerobic streptococci The ventricular system was not involved Sections through the pons and medulla showed focal areas of necrosis

The venous sinuses were not thrombosed Upon removal of the petrous portion of the temporal bone the middle ears and mastoid air cells appeared normal

The pericardial sac contained about 100 ml of purulent foul smelling reddish brown fluid Culture of this fluid also grew anaerobic streptococci There were numerous petechial hemorrhages over the pericardium The microscopic evidence of pericarditis and myocarditis is seen figures 3 and 4 The heart weighed 350 grams All valves were

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Capt Richard J Blanchard USAF (MC) pathology service

ear and 10 per cent come fr m the nose and nasal sinuses Twenty per cent come from localized infection elsewhere particularly the lungs and heart Trauma with direct brain injury inoculation account for another 5 per cent Miscellaneous infections and unknown sites make up the remaining 15 per c t

Ascending and descending in aircraft as this man did in flying is often effective in br nging l tent infections in the ears and sinuses to clinical attention For this re on plus the negative physical examination I am bypassing these as possible sources of infection Special roentgenograms of the teeth and sinuses may have pointed to a site but we do not h ve this inform tion Thus I do not know how the brain abscess originated

The question of what to do was posed by f nding anaerobic strepto cocci in the brain ab ce s Anaerobi streptococci are often present in the mouth nasopharynx and sinuses of healthy people It is a common inhabitant of the vagina Ord narily they become vicious criminals only under anaerobic cond tions These cond tions are met in the post partum uterus in the lung following pulmonary infarction in the paranasal sinuses in the brain nd after h man bites Many strains are pen c llin res stant but this is not an bsolute resistance The method of treatment is g nerally w th ntensive doses of penicil lin This was done s the p t ent recei ed almost 100 million units daily n add t on to the other antib tics This p tient certainly had a resistant strain

It is expected th t the infection would have spreading tendency One of the ch racteristics wh ch made the streptococci so clinically important are the enzymes and subst nces th t the living streptococci prod ce p rticul rly spreading f ctors such as hyaluronidase It would not be surprising then that this abscess was not well encapsu lated

In conclusion I bel eve th t the patient expired from the progres sive abscess exten ion through the brain substance Rupture into the ventricles or into the cerebrospinal p ces with mening tis and a focus for metastatic infection may be found Dr Blanchard may show a focus in the heart or lungs which was not discovered cl nically A more likely primary source of infect on in my opin on however would be an asymptomatic ap cal abscess of a tooth Bacterem a may have occurred during chewing The tooth could move up and down n the tooth pulp like a pisto each time forcing another little fra ment of this apical abscess materi l nto the blood stream The brain abs cess could follow Now let me h ar what really happened

D t J lg Dr Pollard first let me ask you a few questions The ant biot cs did not seem to help What else might have been done that would h ve changed the outcom of this case? And what do you thi k about the absence of fever for at least six days during the de velopment of th absce ?

D t P ll d Th patient ppar ntly did not have a local instil l ti n of ant b oti E ly a d thorough drain ge of brain abscesses



Figure 3 Section of the pericardium showing the inflammatory cells and fibrin deposited over the surface of the heart (× 105)

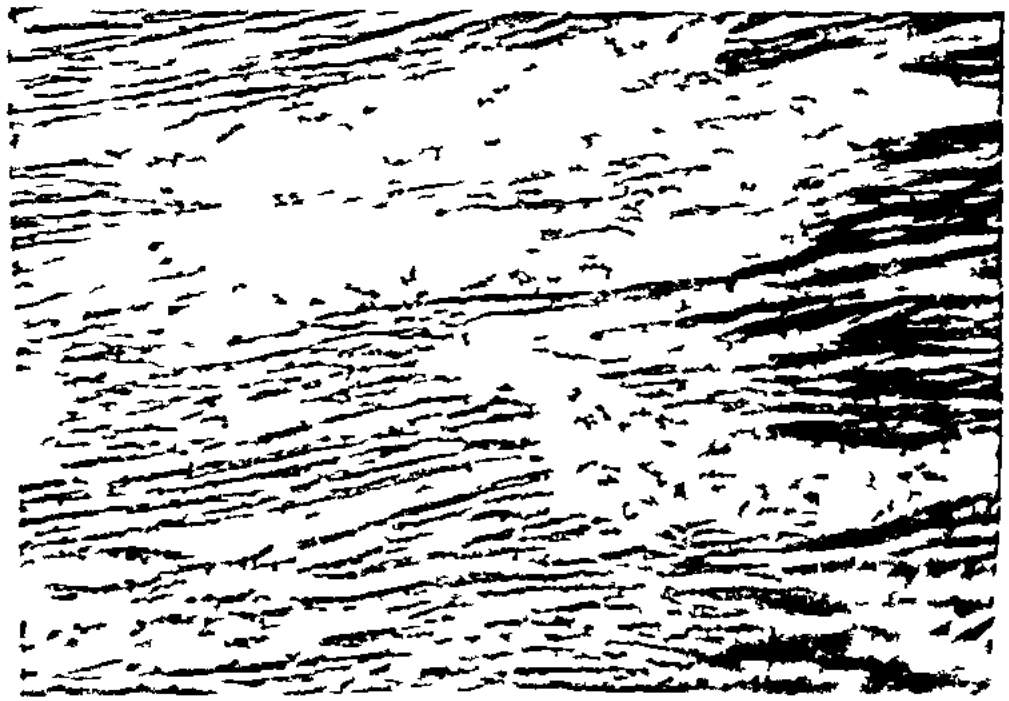


Figure 4 Section of the heart showing a myocardial [illegible] with infiltration of plasma cells and lymphocytes on the epicardium. The inflammatory action here spreads from the pericardial sac (× 105)

Final pathologic diagnoses

1 Focal necrosis in the pons and medulla due to cerebral edema and pressure

2 Brain abscess parietal lobe of the left cerebral hemisphere due to anaerobic streptococcus

3 Purulent pericarditis due to anaerobic streptococcus

D t J ig Th nk you Dr Blanchard We see once more that even the pathologist cannot answer all the questions

Dr Gr ham the neurosurge n who operated on the patient could not be present tod y but Dr Silvernail our other neurosurgeon is here Dr Silverna l do you have any comments on the surgical treat ment of bra n bsces e ? When i the time to operate on this type of case? Has the antibiot c era cha g d your appro ch to the brain abscess?

D t Sil il No antibiotic have not changed the surgical appro ch Brain abscesse m nifest th mselves n many ways First they are divided by their locat on into epidural subdural cortical r intracerebr l brain ab cesses They give signs and symptoms as does ny expand ng lesion by p essure and necrosis on nervous *structures One cannot make diagnos from the outside that it has* encapsulated one can suspect it h s encapsulated if the spinal fluid is cle r If the ab cess is localized a d encapsulated rad c l in cision drainage and antibiotic w ll probably cure it

If there is subcortical d em n tion similar to cellulitis surgical *drainage is going to be in ff ctive antibiotic will not localize it* nd the patient pr bably cannot be aved even with the most radic l procedure Unfortunately thi patient h d such an infection The dis semination was too great My guess would be th t more radical surgery would not have saved h m H d he l ved after more radical surgery he probably would have been totally disabled However once the brain abscess is ente ed surgically r g rdless of the amo nt of encap sulation I would recommend the most radical removal possible with wide dr inage A drain the size of a rectal tube is needed so th t this area can be drained and flush d o t as extensively as possible If it is metastat c in origin there s a fair chance that there is more than one abscess and a thorough search must be made

D et J ig Dr Abrams you suggested that we use the ant biotic ristocetin on thi man As you know the patient expired before it could be given

D t Ab m Rist cetin h s b e offered as a lifesaving anti biot c where others fa led It has gi n good results w th gram po itive organisms that h ve been re i tant to other ant biotics I noticed

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C p W ll m I S l I USAF (MC) ur urg I rv
M ur J Ab m M D I I l m d

recently however a report of two cases of marked leukopenia following its use [7] Both patients recovered after the drug was stopped

I think that in any fulminating infection there are a number of pitfalls One must realize always that organisms are often very prodigious and are very prolific If the patient is not responding to one drug you try another or several in combination In the seriously ill patient with overwhelming infection you do not give trial dosage of drugs You apply massive dosage from the beginning

There are just one or two things that I would like to add As far as the bacteriology is concerned the odor of the anaerobic streptococcus is so characteristic that it was initially called *Micrococcus fetidus* It has been insufficiently investigated so that it has not been put in any of the known groups A through O Too there is some question about the enzymatic system of the anaerobic streptococcus because it is thought that it with Group B does not produce desoxyribonuclease Apparently they all produce fibrinolysin and hyaluronidase

Doctor Jurgen Mr Johnson as the bacteriologist on this case do you have any additional information to offer about this deadly bacteria?

Mr Johnson This bacteria produces no "C" reaction protein and therefore cannot be classified serologically I think we proved that the bacteria from the brain abscess and the pericardium were the same Apparently they had not been affected by the antibiotics Thus the in vivo sensitivity did not compare with the in vitro sensitivities This certainly is not a rare observation

Doctor Jurgen Dr Cocks do you have any comments to make?

Dr Cocks One does not need to have increased cells and proteins in the cerebrospinal fluid and fever to suggest brain abscess In some series this finding is often absent Severe focal seizures and focal persistence such as this patient had the third or fourth hospital day are suggestive signs of brain abscess

Doctor Jurgen Dr Morgan you were the principal physician until the patient was transferred to the neurosurgical service We should like to have your comments

Doctor Morgan I would like to comment on the quality of the headache It was a sudden sharp painful tingling numbness which possibly may have represented either an aura of the seizure or a premonitory phenomenon itself It was not similar to the usual headache one sees in intracranial expanding lesions

Doctor Jurgen These comments from the clinicians and the neurologist speak for themselves The site of origin for the anaerobic streptococcus which caused the brain abscess and

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Captain [illegible] Bacteriology
Lt Col Gail R. Cocks USAF (MC) chief neurology service
Capt Paul M. [illegible] USAF (MC) neurology service

mains unknown In general we heard that earlier surgical attack and other antibiotics may have altered the course However most agree that our present means of ther py is frequently inadequ te for this type of central nervous system infection

RFFERENCES

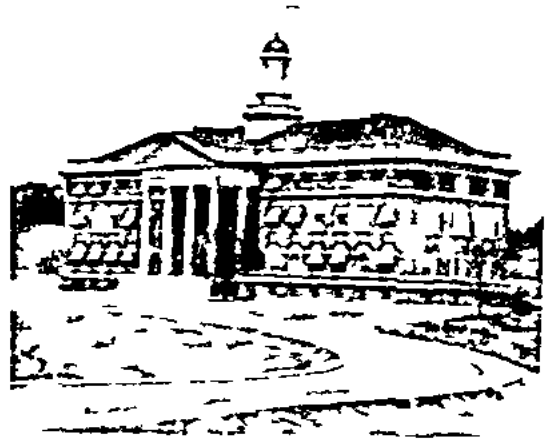
1 B d M B Extinct and p p t t f t *A h Netwol & Psy h at* 54 1 9 J ly 1945
2 B d M B Sh pir M. F d Schapp ll A. W Ext ph m in h m pl g *A h N uvol & Psy h at* 62 717 725 D 1949
3 B der M B F k M nd G M. P p pt m l t f f and h d *A. M. A. Ar h N ur l & P ychiat* 66 355-362 S p 1951
4 W lff H G H d h I M Btyd C M (d t) *S gn and Symptom Appl d Patbol g Phy l gy and Cl al Interp tat on* 3d d J B L pp C mp y Ph l d lph P 1957 pp 66 72
5 L w W R d l pmen ma g m f b b *B t M J* 1 631 634 M 12 1955
6 D O J B b l g t p bl m *J A. M A* 96 481 487 F b 14 1931
7 N wt R M. d Ward V G L k p ia ia d w h oc (p) dms *J A. M. A.* 166 1956-1959 Apr 19 1958
8 Swift H F S p In D bo R J (d) *Bacterial and My t l fect on f Man* 2d d t J B L pp C mp y Ph l d lph P 1952 p 307

NOISE IN HOSPITALS

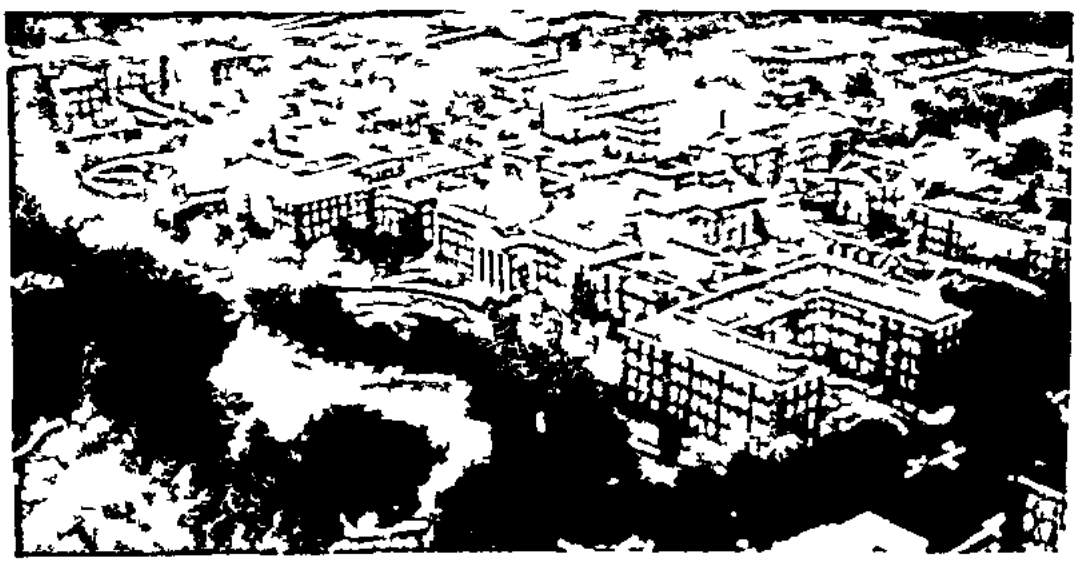
Noise is rel tively dis gree ble s und A hi fi s t m y soothe one yet irk another The arguments pro and con jazz ar leg on However there very little disagr ement concerning the noise mak ng potent al of a hospital Man and machines comp und an impact of decibels which *unnot ceable to the healthy c n pro e of considerable an* noyance to the ill Some sound may prove helpful in com batting the psychological h zards of sensory deprivation which many p tients are subjected to in a hospital en vironment Noise on the other h nd gener ted by many disco dant sources can be annoying and ven relatively harmful With an ear cocked for noise we suddenly become p inf lly aware of the rumbling f od c rt the squ aky bed the hissing radiator the slamming elevat r door the wooden heels of the corpsmen the var ous repa rmen invol ed in their clanging and banging the jarringly lo d telephones the bl sting paging systems (for long distance tr ffic it wo ld appear) the pat ents loud radio d a seem ngly dl s cce sion and superimposition of ann y ng n ises *A n y hospit l loses its dign ty Let s reduce the decibels* d m k ou hosp t l quiet pl ces for quiet speedy re co e y —Ho p tals nd Decibels *USAFE Su geon Comments* Feb u ry 1959

WALTER REED ARMY MEDICAL CENTER, OPENED IN 1909, CELEBRATES FIFTIETH ANNIVERSARY

Walter Reed Army Medical Center a renowned military treatment facility located in the District of Columbia six miles north of the Nation s Capitol celebrated its 50th anniversary on 1 May Dedi cated in 1909 as Walter Reed General Hospital in honor of the con queror of yellow fever its name was changed in 1923 to the Army Medical Center On the centennial of the famous Army doctor in 1951 the hospital was renamed Walter Reed Army Medical Center A Class III installation commanded by Major General Leonard D Ieaton MC USA the center includes Walter Reed Army Hospital Walter Reed Institute of Research Central Dental Laboratory and the Army Prosthetics Research Laboratory One of the largest and best equipped in the world the hospital has cared for more than 405 000 patients since 1909 The original capacity of about 80 beds has been expanded to 1 250 but when the Korean fight ing was at its height as many as 2 300 patients were cared for at one time The yearly bed patient average is about 16 000



Walte Reed Gene al Hospital n 1909



Walt Reed A my Med cal Ce te as it appears today

ARMY NAVY OFFICERS PRESENT PAPERS AT AMERICAN COLLEGE OF PHYSICIANS MEETING

Military medical officers presented several important clinical studies in the scientific program of the fortieth annual session of the American College of Physicians held in Chicago 20-24 April. The speakers and titles of their papers included:

Congenital Anomalies of the Lung Parenchyma—*Colonel James A. Wier, MC, USA*, Fitzsimons Army Hospital, Denver, Colo.

The Reliability of Tuberculin Diagnosis in Pulmonary Roentgenology—*Major Joel H. Richter, Colonels James A. Wier and John W. Saly*, and *Maj. James C. Boyer, MC, USA*, Fitzsimons Army Hospital, Denver, Colo.

Apparent Myocardial Infarction Following Electroshock Therapy—*Captain Robert B. Abington*, Tripler Army Hospital, T.H.; *Colonel Wilbur C. Berry*, Madigan Army Hospital, Tacoma, Wash.; and *Captain Frederick S. Armstrong, MC, USA*, Walter Reed Army Hospital, Washington, D.C.

Paroxysmal Left Ventricular Tachycardia with Hypothyroidism, Partial Left Bundle Branch Block and Thyroid Disease—*Captain Arthur S. Wessbecher* and *Major John D. Lawson, MC, USA*, Brooke Army Hospital, San Antonio, Texas.

Ventricular Depolarization and the QRS Complex—*Captain Robert V. Dickson, MC, USA*, Army Medical Research Laboratory, Fort Knox, Ky.

Some Aspects of the Metabolism of Pyruvic Acid—*Lieutenant Colonel Irvin C. Plough, MC, USA*, and *Captains Edwin L. Bierman, MC, USA*, and *Eugene M. Baker, MSC, USA*, Fitzsimons Army Hospital, Denver, Colo.

Problem Cases from Shop for Optic Disc—*Captain Harry J. Davis, MC, USN*, Bureau of Medicine and Surgery, Washington, D.C.

Physiologic Studies Encouraged by Aviation—*Captain Charles F. Gell, MC, USN*, Office of Naval Research, Washington, D.C.

Some Aspects of the Physiologic Responses in Space Flight—*Captain Norman L. Barr, MC, USN*, Bureau of Medicine and Surgery, Washington, D.C.

A scientific exhibit on the Intestinal Biopsy Capsule from the Armed Forces Institute of Pathology was presented by Lieutenant Colonel William H. Crosby, Jr., and Majors C. E. Butterworth, Jr., and Robert W. Smith, MC, USA, Walter Reed Army Institute of Research, and Colonel Benjamin H. Sullivan, Jr., MC, USA, Walter Reed Army Hospital, Washington, D.C.



ALASKA VISITOR Dr Edward H Cushing Deputy Assistant Secretary of Defense (Health and Medical) left is shown with Lt General Frank A Armstrong Jr USAF commander in chief Alaskan Command and Brig General John R Copenhaver USAF (MC) command surgeon during a recent inspection of Department of Defense medical facilities in the new state General Copenhaver upon completion of his Alaskan tour of duty in June will become surgeon of the Tactical Air Command Langley Air Force Base Va

NAVY OFFICERS PARTICIPATE IN DENTAL MEETINGS

Captain Charles T Pridgeon and Lieutenant Commander Charles S Scruggs DC USN will present papers at the 79th annual conference of the British Dental Association at Torquay England 25 29 May 1959 on The Clinical Use of Anorganic Bone in Selected Infra Bony Peridontal Pockets and Indications for Endodontics respectively They also spoke at the annual clinical meeting of the American Dental Society of London 19 March 1959 The two officers are on duty with the U S Naval Support Activity London

Lieutenant Ralph P Huestis DC USN U S Naval Air Station Whidbey Island Washington presented a table clinic on Vibration Technic for Amalgam Restoration at the annual meeting of Washington State Dental Association in Seattle 6 8 April

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Clinical Manifestations of the Lymphogranuloma Inguinale Group of Diseases—Colonel James A. Weir MC USA Fitzsimons Army Hospital Denver Colo.

Thrombophlebitis: Pathogenesis, Prophylaxis and Therapy—Major Joel H. Richert Colonels James A. Wier and John M. Salyer and Major James C. Beyer MC USA Fitzsimons Army Hospital Denver Colo.

Application of Electroencephalography to Problems of Head Injuries—Captain Robert B. Abington Tripler Army Hospital T. H. Colonel Wilbur C. Berry Madigan Army Hospital Tacoma Wash. and Captain Frederick S. Armitage MC USA Walter Reed Army Hospital Washington D. C.

Pediatric Lymphogranuloma Inguinale with Involvement of Central Nervous System, Thyroid Gland and Thyroid—Captain Arthur S. Wessberg and Major John D. Lawson MC USA Brooke Army Hospital San Antonio Texas.

Vitamin Deficiency Patterns and the QRS Complex—Captain Robert V. Eck son MC USA Army Medical Research Laboratory Fort Knox Ky.

Smallpox Antibody Titrations of Persons Subsequent to Smallpox Vaccination—Lieutenant Colonel Irwin C. Plough MC USA and Captain Edwin L. Brennan MC USA and George W. Baker MSC USA Fitzsimons Army Hospital Denver Colo.

Public Health Concepts of Shipboard Food Sanitation—Captain Harry J. Alvis MC USN Bureau of Medicine and Surgery Washington D. C.

Physiological Studies Conducted by Aviation Medicine—Captain Charles F. Gell MC USN Office of Naval Research Washington D. C.

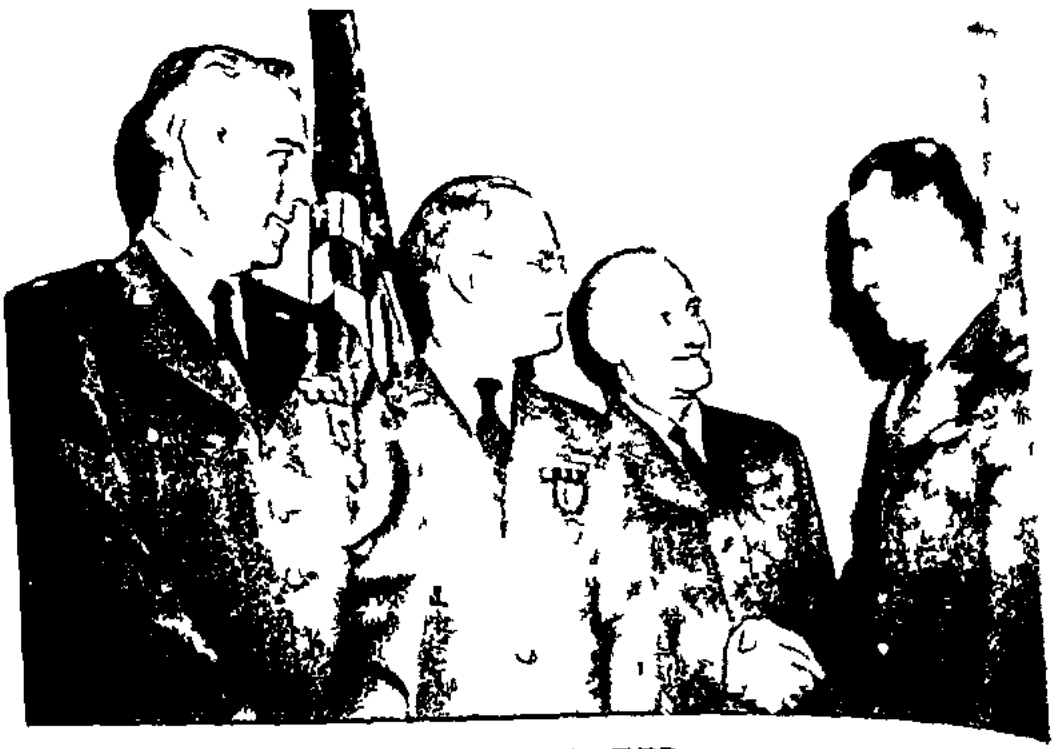
Skill of the Medical Officer in the Physiological Requirements of Space Flight—Captain Norman L. Barr MC USN Bureau of Medicine and Surgery Washington D. C.

A scientific exhibit on the Intestinal Biopsy Capsule from the Armed Forces Institute of Pathology was presented by Lieutenant Colonel William H. Crosby Jr. and Majors C. E. Butterworth Jr. and Robert W. Smith MC USA Walter Reed Army Institute of Research and Colonel Benjamin H. Sullivan Jr. MC USA Walter Reed Army Hospital Washington D. C.

CAPTAIN HOLLER RECEIVES COMMENDATION

Captain Moffitt A Holler MC USN right received a commendation from Rear Admiral E W Grenfell Commander Submarine Force U S Pacific Fleet in a ceremony aboard the U S S *Gudgeon* 10 January 1959 The commendation for outstanding service from June 1956 to January 1959 makes special mention of Dr Holler s supervision over twenty cases of decompression sickness which were successfully treated averting serious physical disability and in several instances death





AIR FORCE COLONELS DECORATED Major General Olive J Niess Air Force Surgeon General congratulates three award win following presentation of awards in a ceremony on 13 March 1 Left to right Colonel Jack C Carmichael USAF (MSC) who ceived the Legion of Merit Colonel Herbert W Coone USAF (Mc the Air Force Commendation Medal and Colonel Ralph H I USAF (MC) the Legion of Merit All are assigned to

A Message From the A M A

Megaton nuclear devices and missiles delivery weapon systems have radically changed concepts of warfare The inevitable concomitant is radically changed concepts of emergency medical treatment The increase in the destructive power of weapons means a correspondingly larger involvement of civilian populations in warfare This larger involvement of civilian populations in any future war which may unleash its massive destructive fury with warning time counted in but minutes requires prior cool judicious planning and organization to minimize the effects of modern weapons In these days of warlike coexistence for peace there is urgent need for a suitable national plan that will offer the nation s people the best feasible protection against nuclear weapons and the best possible disaster medical care

Civil defense has been a concern of government since before World War II In the Federal government the responsibility in varying degree for civil defense over the years has reposed in many different agencies Since 1950 with the creation of the Federal Civil Defense Administration the first independent agency wholly concerned with civil defense there have been plans for the medical care of stricken populations after enemy attack Original plans were based on an A bomb attack (nominal or 20 000 ton TNT equivalent) and envisioned three echelons of service (1) self help family help neighbor help and community help (2) mutual assistance or the support and aid that would come from the surrounding populace for example suburbs in the case of large cities and (3) mobile reserve or those units that would come a distance to give aid and succor to a stricken community Medical care would follow three steps (1) first aid given either in the rubble at collecting points in the field by field first aid teams or at the first aid station (2) emergency urgery at the 200-bed Civil Defense Emergency Hospital and (3) definitive care at existing hospital and medical facilities

As bombs became larger and weapon delivery systems speedier it was necessary to revise the plans considerably Limitations of staff inadequate facilities for securing vital data urgency of daily operation administrative proolems and a variety of other causes did not permit the staff of the then Federal Civil Defense Administration Health Office to engage in this type of necessary planning As a consequence on 10 December 1956 the Federal Civil Defense Administration requested the American Medical Association through its Council on National Defense to undertake a study to establish criteria for the provision of medical

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care of the surviving population, casualty and noncasualty, in the event of an enemy attack on this nation The proposal was presented to the Board of Trustees of the Association on 9 Feb ruary 1957 The Board authorized the Council on National De fense to explore this proposal in detail A formal contract be tween the United States Government, acting through the Federal Civil Defense Administration, and the American Medical Associ ation was signed on 26 July 1957 In broad terms the contract specified that the Association should "study, develop and recom mend the planning, training and operational organization needed as a basis for a National Emergency Medical Care Plan for the treatment and care of casualties and noncasualties prior to, during and after a hypothetical 20 megaton ground burst thermo nuclear attack upon a selected geographical area or areas of the United States "

To facilitate work on this project, the Association created the Commission on National Emergency Medical Care The six members designated to serve on the Commission were Brigadier General Harold C Lueth, MC, USAR, Chairman, Captain Carroll P Hungate MC, USNR, John F Burton, M D , Robert L Novy, M D , Colonel Karl R Lundeberg, MC, USA, (Ret) and Colonel Hanns C Schwyzer, MC, USAR Major General Earle Standlee, MC, USA, (Ret) was named staff director Three task forces on organization, emergency medical care, and personnel training and utilization, were created Serving on these task forces were qualified and dedicated personnel from the health professions Throughout the study, opinions were obtained from many of the national health agencies, the voluntary health associations, personnel in various branches of the government, from individuals and from prior reports, studies, plans and recommendations of many organizations both governmental and nongovernmental From all these sources the Commission developed recommenda tions that can be used as a basis for a national emergency medi cal care plan

During the period of the study there were significant accom plished changes in the government agencies concerned with civil defense affairs Other changes have been proposed and are under study On 1 July 1958 under the President s Reorganization Plan No 1 of 1958 the Federal Civil Defense Administration and the Office of Defense Mobilization were consolidated to form the Office of Civil and Defense Mobilization in the Executive Office of the President Former Governor of Iowa Leo A Hoegh, who had been Administrator of the Federal Civil Defense Adminis tration was appointed Director of the new agency by the Presi dent Another significant development was the proposed delega tion by the President of certain responsibilities for civil defense health services to the Secretary of Health, Education and Welfare for discharge by the United States Public Health Service under the policy guidance and direction of the Office of Civil and De fense Mobilization Principally this [illegible]ns the re

sponsibility for planning a nationwide health and medical care program dealing with the care of the civilian population in the event of an enemy attack The American Medical Association favored these developments and was of the opinion that much ambiguity uncertainty and confusion of past organizational structure would be obviated

Yet another important development was the promulgation by President Eisenhower in October 1958 of the National Plan for Civil Defense and Defense Mobilization When completed by the addition of 40 operational annexes all phases of civil defense operations will be covered Annex No 7 Role of the Military which is now ready for promulgation will be of particular interest to military personnel It sets forth the responsibilities of the Armed Forces of the United States in assisting civil authority in time of national emergency or other disaster

The Association s Commission on National Emergency Medical Care completed its study in November 1958 After careful review by the Council on National Defense and other departments of the Association the final report of the Commission was adopted by the Board of Trustees on February 24 1959 The report was submitted to the Office of Civil and Defense Mobilization last month

Developing criteria for planning training and operating a medical service that will give the greatest good to the largest number of people under the catastrophic conditions resulting from a thermonuclear burst of 20 megatons required bold thinking resourceful planning and radical departures from accepted patterns of scientific medical care All individuals and organizations that were requested to assist the Association in this unique and challenging task did so with zeal and devotion Their dedication is worthy of the highest praise

The implications of nuclear attacks are so great that each physician dentist veterinarian nurse and health worker must prepare to give medical service of a type and scope that has never been done before It would be well for all health workers military and civilian to give this matter their most serious consideration

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NAVY COLOR VISION FILM WINS AWARD

Color Vision Defic encies a 20 min te motion pictur film produced in colo by the Navy s Bureau of Medicin and Surgery h rece d an Ed nburgh Intern t onal F lm Fest val cert f cate The cert f at was pre nted by B tish Ambassador S r I rold Cacc a to Rear Adm r l Wellington T H nes USN Deputy nd Assistant Chief of th Bur u of Aero ut s during ceremonies in W shingt n on 9 March Dur g the p t fiftee y the Navy h s rece ved mor than 30 t on l and nte n t l pr fo t mot n pictur s

Officers Certified by Specialty Boards

The Surgeons General of the military medical services have announced that the following regular Medical and Dental Corps officers have been certified by the boards indicated

American Board of Dermatology

Flan gan Br a P M j USAF

Jacobs Paul H Capt USAF

American Board of Internal Medicine

G rd Earl S C pt USA

Cardiovascular Disease

P rmley Lor n F Jr Lt Col USA

Pulmonary Diseases

D gto Willi m G C l USA

R ch rt J el H M j USA

American Board of Ophthalmology

J es C lt E C pt USAF

American Board of Oral P thology

H L S Capt USN

American Board of Pathology

Clinical I athology

R y J hn P J C pt USA

American Bo rd of Pediatrics

Smith Robert E Capt USAF

American Board of Psychiatry and Neurology

Psychiatry

B llet Sa ford L Capt USAF

American Board of Radiology

Medical Nuclear Physics

Griffi Marti E Jr Capt USA

M er J hn G Capt USA

L ngd Edw rd A. Lt Col USA

American Board of Surgery

B t v s S v rio S. C pt USA

H nd r n H rry M Jr Lt Col USA

American Board of Urology

J h t h R b rt E Lt Col USA

PROTEIN FOUNDATION REPORTS PROGRESS IN BLOOD STUDIES AT CHELSEA NAVAL HOSPITAL

Sign ficant progress in studies at the U S Naval Hospital Chelse Mass on red blood cell preservation by freezing are revealed in the fourth annual report of the Protein Found tion and the Comm ssion on Pl sma Refract onation and Related Processes wh ch was r cently published Ch rles A Janeway M D professor f ped atr cs at Harvard Medical School is presid nt of the foundation which is co operating with the Navy in the work now in progres at the Blood Research Laboratory in Chelsea The report in p rt tates

App m t ly t y h l p d s th t pr g m f pl m f t ti w s b g n d r th mp t f th w t d f s f d ff t pl sm xp d r N m l h m um lb m d l mit d q t t t P l H b w th f t hum pl m d t metg f m h t p g m S c th n th bl d h p d a w ll p g t k w l dg f b d ly f t d th p t l d f th l dg r l b f l d d l f g p p rt f th bl d w b m d u f by th phy f th ll f ff g S m f od y g t th am ph m wh t h p d h t t t th b g g of th p g m Oth t g ar q w f m d p bl by th d t f w t ch q th pe m h th t mp bl pe m l s t w p bl m

A h p t t g p of t g b g pur d tl blood ll O f h d ot d t h l g t m pr t f red ll p j t wh h e mp t mpl t for th p bl h lth d th at l d f Th w rk h b und th d t f D [J m L] T ll s tw pl Tl frr t fund m t l t dy h b p g f m y n h Bl d Cb d P rv L bo y d l d t h bl hm t f p t l p o- dur f d g gly l d ll p t f g d l t m thod f t lt ma m l f th gly l d t n f th c lls t o m t t f t y f u e Dur g th p t y th t dy h b d w h th k pect f th pa g f th gly l n d t f th ell— mp t b h f th l ght ch *f m t sh d th tur* f th ll m mb w ll th p l p obl m of th m mum t wh h th t p g f ll b i d l h b f d h t d l th m d m p rt ul ly m g m h tr g fl th wh h gly l m t f h h w d ll I dd t f l d h be m d th ll t f h b hem l m th ll ur l f ll f ll w g f g h l d d th ff f dd d gl d h gb- cy ph ph omp d mp l



L ft t ght D W K J d p l t P t l ndat R ldm l C l F Γ p USN mm d t Γ t Na l D t t D Γ k B Γ rry A t t S tary f D f (ll llh d M d ll) nd C pt C l D R gg MC USN mm l g ff U S Na l ll p t l Chel Ma

the inclusion of chapters on principle of anesthesia radiology of the abdomen radiotherapy and on common surg cal instruments The index is adequate There is no b bliogr phy or reference to source material Written for the student prepa ing for f nal examinations it will serve that purpose for the undergraduate

—*DON S WENGER Col USAF (MC)*

TREATMENT IN INTERNAL MEDICINE by *H rold Th m Hym* M D 609 p g ill t t d J B L pp t C mp y Ph l d lph P 1958 P $12 50

This is an unusu l publication It is an encyclopedia of treatment which could well occupy several v lumes The fact that it is compress d into a single volume attests to the ability of the a thor to include only the essenti ls At the ame tim it is *not presented in outline* form but in a very re dable manne The book divided into ten sec tions starting w th the inf ctious di ea es nd ending w th di tu bances in the speci lty f elds wh ch frequently conf ont pract t oners G n r l ly each sectio starts with a li t of drugs used along w th dos g commercial name and u toward side effects The disc ssion then proceeds quickly to immed ate ca co tinuing care and care of c mp- lications Cross *ref renc* are *made to other portio s of the book* and reference to th liter ture appear within the body f the m terial which does not interfere with the tr n of thought The accomp ying charts list and illustr t ons are approp iate and clear The ndex is complete To se this book is to purchase it It should enjoy w de spre d usag bec se of ts pr cticality and readability

—*WILLIAM G DUNNINGTON C I MC USA*

DEFICIENCY DISEASE F t al d St tural Ch g M mm l Wh h R ultF mE d g L k f O M E t l N t by *R b d H Foll J* 577 p g ll s t d Cl l C Thom Sp gf ld Ill 1958 P $14 75

Dr Follis new book is unusu l in several respects Fi st t is oriented w th the newer concept that nutriti nal di order include disturbances ascribed to the many conditioning f ctors which may p oduce g neral or local reduct ons o deficiencies of essential nutrients Second it is a book deal n, w th clin cal and metabolic features of defic ency states but with a strong mphasis on pathologic changes This of course reflects the author s well known interest in pathology As a matter of fact it is a logical o tgrowth of Follis previou book *The Pathology of Nut itional D sea* written t n years ago *Third it is unusually well documented There s* bibl o- graphy of 1 535 tems a d readers will w lcome the full author and subj ct nde Attention should be called to a part cularly aluable ch pter on d fic ency dise se as esea ch method in b ology and m d ne I dd tion the author should be commended for includ ng d c si n of such t p cs dental cari s kwash orkor enden c g t l a d ease and the hypokalemic yndrome Perhaps in f t e n of th book t m y be worth *includ ng d s rders s ch* th oscl s wh h m y be rel ted to an mbala ce or excess

of certain nutrients rather than limit the top cs to deficienc c i
This is a valuable book because of its emphasi c s
functional changes resulting from the endogenous or ex
o one or more nutrients It is printed on good pape the
and type are excellent It will prove to be a useful
tional literature —S O WAIFE Lt Cmdr MC USNR

THE RECOVERY ROOM A Symposium by John Adriani M.D and John B. Parmley M D American Lecture Series Publication No 340 A Monograph by American Lectures in Anesthesiology 123 pages Charles C Thomas Publisher Springfield Ill 1958 Price $4.25

The recovery room must no longer be considered as only desirable but as a requisite in any surgical suite This symposium is in question and answer form with a panel of many experts in the fields of anesthesiology surgery nursing and hospital administration providing the responses The book is well indexed and so organized that all pertinent phases of construction staffing and operation are well represented Charts and illustrations where appropriate are inserted for clarity The format is more difficult to read than a narrative approach but the panel type of response makes this unavoidable Anesthesiologists who habitually control and operate recovery rooms will find no new material here but for those who contemplate construction of new operating suites and for the newcomers unaccustomed to completely appointed recovery rooms much valuable basic information is herein available The economics of operation and cost factors should be of interest to all civilian hospital administrators —*JOHN F KELLOGG Jr Lt Col MC USA*

ANATOMY FOR SURGEONS Volume 3 The Back and Limbs by W Henry *Hollinshead* Ph D 901 pages illustrated Paul B Hoeber Inc Medical Book Department of Harper & Brothers New York N Y 1958 Price $23 50

This is an excellent book on regional anatomy of the back and limbs for the surgeon who desires a convenient and readable reference of the clinical aspects of the subject The author presents a well organized anatomic compendium gleaned from his former lectures in surgical anatomy and suggestions and observations the author has received in consultation with practicing surgeons of the Mayo Clinic and Mayo Foundation The book is neither intended nor designed as a surgical anatomy with emphasis on surgical approach and detail but has been written for the surgical resident and practicing surgeon The diagrams selected from the author s personal collection of line drawings and lecture illustrations and published literature are ample in number and well chosen for simplicity and clarity of interpretation At the conclusion of each chapter is a very adequate list of references from the literature for the reader s convenience should he desire to pursue the subject matter in more detail The book nine chapters and index includes considerations of anatomic tissues common to both the back and the limbs a general survey of the development and general anatomy of each region and detailed discussion of each regional anatomic entity

—ALAN B BAKER Lt C

LIPPINCOTT'S HANDBOOK OF DENTAL PRACTICE ed ed by L ... G ... m D D S. 3d ed t 534 p g ll t t d J B L ppinc tt C mp y Ph l d lph P 1958 P $14

Whence cometh the n me handbook ? In this case from the attempt to provide a handful of info mation on just ab ut every phase of den tistry Technical a pects are llustrated through sample technics Didactic or b ckground information r ceives a summation by an author ty in the field The list of cont butors reads like an honor roll of den t stry The chapter on Hyp osis as Applied in Modern Dental Practice contains a suffici t number of case histories to give the reader a good trend of thought along th l nes of indications and ad antages of this useful adjunct Techn c for nducing the hypnotic state ar not given but it s one of the best preface to hyp osis in dentistry we have seen Other sections a e d voted to diagnosis and treatment and roentgenograph c interpret tion A discussion of oral diagnosis provides an o derly tho ough appraisal examinat on and evalu tion of the patient It is an excellent expo ition of how to use our i creas ing dental knowl dge by direct ng t eatment toward cause as opposed to the older concept of emp r c l and syst matic treatment It cannot help but start the tr atment pl n n its most effective directi n There are a few things which lead to m xed feelings Several misplacements of captions and illustrat ons occur Some subjects inev t bly suffer from o ercondensation In som cas s the brilliance of the contributor s original text does not shine through Th s v lume contains much sound usable and d versifi d m teri l here For more detailed information th reading guides will be helpful

—*JULES D KARTMAN Lt C l USAF (DC)*

THE ABO BLOOD GROUPS C mp h T bl and M p of W ld D but on by *A. E M w t* M A D Ph l D M (O f rd) M R C P (L d) *Ad C. K p* D S (G) d *k m D m w k S b k* M A (W lno) A L A 276 p g Charl C Th m P bl h Sp gf ld Ill 1958 P $8 50

The human erythr cyte is the most sci ntifically useful of ll our tissue It is inst ntly available in large amounts and it is sturdy enough to withstand manipul tion and storage In the f eld of metabol ism the red cell serves as a model for the study of normal and ab norm l metabolic processes Because of its relativ ly short life span it is ble to provide nf rmation concerning the aging process It is affl cted by many hereditary d seases which m ke t a useful subject for the geneticist The antigenic structure is also genet cally deter mined and s o complex as to m ke person s erythrocytes as in d vidual as hi fingerp nt Study of th blood group antigens in rio s pa ts of the wo ld has demo str ted that gen frequencies d ffer greatly mong the hum n population groups Therefore the di tribution of the h m blood group gene t of mpo t nce not only to the genet cist but o the nthr pol gist and ethnolog st a well Some years ago Dr Mour n und to k to comp le ll f the publi hed work on the fre qu of th t bl od gro p y tems known at the present time The ABO yst m b c u f th m s t mo nt f material ava l ble

imposed a serious handicap on the project So it was decided first to complete the work on the lesser blood group systems and this resulted in the publication in 1954 of *The Distribution of the Human Blood Groups* The present volume companion piece of the earlier work is a tabulation of the data on the ABO system which had been published before the end of 1957 The book is a monumental accomplishment containing approximately 4 000 entries ranging from Abda in Morocco to the Zyrians of the USSR In each instance the proportion of the blood groups O A B and AB of each population is tabulated In addition gene frequencies have been calculated and tests for homogeneity have been applied A separate tabulation deals with the A_1 A_2 BO blood groups

—*WILLIAM H CROSBY Lt Col MC USA*

TUMORS OF THE LUNGS AND MEDIASTINUM by *B M Fried* M D F C C P 467 pages illustrated Lea & Febiger Philadelphia Pa. 1958 Price $13 50

This book is written in a clear concise fashion reflecting the vast experience of the author and his collaborators in this field A significant portion of the text is devoted to carcinoma of the lung This disease is considered in an orderly manner as to etiology, diagnosis prognosis and treatment Metastatic carcinoma is discussed both as a primary lesion in the lung metastasizing to distant organs and the lungs as a target for metastasis from primary cancers in virtually every part of the body Prognosis and treatment are considered for each category Tumors of the mediastinum are presented in the second part of the book and this section includes the manifestations of primary and metastatic disease as well as such conditions as leukemia and Hodgkin s disease which are considered as general in nature There are a number of excellent illusttations and diagnostic x rays The book is recommended to all doctors interested in diseases of the chest as an excellent reference —*SHAKEEB EDE Capt MC USN*

THIRST Physiol gy of th Urge to Drink and Problems of Water Lack by *A. V Wolf* Ph D 536 p ges illustrated Charles C Thomas Publisher Springfield Ill 1958 Price $12 50

Of the two parts into which the book is divided the first is an exhaustive review of the literature on thirst and closely related topics (893 references are given) Especially interesting are the discussions of thirst in hot environments and the effects of drinking sea water As the points are developed throughout this part of the book they are supported by tabulated data and curves In addition there is considerable use of mathematical formulations All of this should make this a valuable source book The second part contains accounts of persons who suffered prolonged water deprivation on the desert or while adrift at sea This book should be of interest both to readers who have only a casual interest and to readers who are actively concerned with problems relating to water balance It should be of great [illegible] concerned with military medicine —*HENRY B HALE Pb*

LIPPINCOTT'S HANDBOOK OF DENTAL PRACTICE edited by L... G... D.D.S. 3d ed. 534 pages illustrated. J. B. Lippincott Company, Philadelphia, 1958. $14

Whence cometh the name handbook? In this case from the attempt to provide a handful of information on just about every phase of dentistry. Technical aspects are illustrated through sample technics. Didactic or background information receives a summation by an authority in the field. The list of contributors reads like an honor roll of dentistry. The chapter on Hypnosis: Applied in Modern Dental Practice contains a sufficient number of case histories to give the reader a good trend of thought along the lines of indications and advantages of this useful adjunct. Technic for inducing the hypnotic state are not given but it is one of the best prefaces to hypnosis in dentistry we have seen. Other sections are devoted to diagnosis and treatment and roentgenographic interpretation. A discussion of oral diagnosis provides an orderly, thorough appraisal, examination and evaluation of the patient. It is an excellent exposition of how to use our increasing dental knowledge by directing treatment toward cause as opposed to the older concept of empiric and systematic treatment. It cannot help but start the treatment plan in its most effective direction. There are a few things which lead to mixed feeling. Several misplacements of captions and illustrations occur. Some subjects inevitably suffer from overcondensation. In some cases the brilliance of the contributor's original text does not shine through. This volume contains much sound, usable and diversified material here. For more detailed information the reading guides will be helpful.

—*JULES D. HARTMAN, Lt. Col., USAF (DC)*

THE ABO BLOOD GROUPS. Comparative Tables and Map of World Distribution by *A. E. Mourant, A. C. Kopec, D. Sanger (Oxford)* and *M. R. Candela (Long Island)*. 276 pages. Charles C. Thomas, Publisher, Springfield, Illinois, 1958. $8.50

The human erythrocyte is the most scientifically useful of all our tissues. It is instantly available in large amounts and it is sturdy enough to withstand manipulation and storage. In the field of metabolism the red cell serves as a model for the study of normal and abnormal metabolic processes. Because of its relatively short life span it is able to provide information concerning the aging process. It is afflicted by many hereditary diseases which make it a useful subject for the geneticist. The antigenic structure is also genetically determined and is so complex as to make a person's erythrocytes as individual as his fingerprints. Study of the blood group antigens in various parts of the world has demonstrated that gene frequencies differ greatly among the human population groups. Therefore the distribution of the human blood group genes is of importance not only to the geneticist but to the anthropologist and ethnologist as well. Some years ago Dr. Mourant undertook to compile all of the published work on the frequencies of the then known blood group systems known at the present time. The ABO system, because of the *enormous amount of material available*

CLINICAL HAEMATOLOGY IN MEDICAL PRACTICE by *G C de Gruchy* M D (Melb) F R A C P M R C P (Lond) M C P A with a Foreword by *J V Dacie* 620 pages illustrated Charles C Thomas Publisher Springfield Ill 1958 Price $10

Each year hematology (and the rest of the world) becomes more complicated The new diseases new factors new drugs new complications pile one upon the next in such profusion as to make specialism within the specialty seem reasonable and the books about hematology seem ever narrower in scope or else more massive This book runs counter to the trend Although it professes to be a book of clinical hematology, it is no mere precis of diagnostic tests and therapeutic schedules *It is rather a sound well ordered and well written* account of the contemporary status of hematology The physiology of the organ system is set forth and against such a background are described the many diseases of red cells white cells marrow and lymphatic tissues Emphasis is placed upon what the physician must do Everything is handled with gratifying clarity and conciseness Remember the time Voltaire wrote to a friend "I am making this a long letter because I haven t time to write a short one"? Well Dr de Gruchy has taken the time —*WILLIAM H. CROSBY Lt Col MC USA*

TEMPORAL LOBE EPILEPSY A Colloquium Sponsored by the National Institute of Neurological Dis ases and Blindnes National Institutes of Health Bethe da Maryland In Co-operation with the International Le gue against Epilep y Edited by *Maitla d Baldw n* M D and *Pea ce Ba ley* Ph D M D Coeditors *Cos mo Ajmon Ma san lg Klatzo* and *Donald Towe* 581 page llu trated Charles C Thomas Publisher Springfield Ill 1958 Pr ce $15 50

The co ordinated efforts of 56 contributors are *reflected* in the various papers presented in this book I had the good fortune to attend most of the meetings and found them to be among the best in my experience *This book is as broad in scope* as is the problem of temporal lobe epilepsy The problem is first considered from the standpoint of electroencephalography and neurophysiology with highlights such as the identification of prominent potential changes in hippocampal seizures in animals which are attributable to dendritic excitation further elucidation of the graded response mechanisms of neurons and discussion of the gradual anterior progression of spike foci in children to mention a few In the second part pathologic aspects of temporal lobe epilepsy are discussed and there is an eye opener by Webb Haymaker in which he examines many cases of *temporal lobe pathology and finds no seizures in the histories* There follows an excellent section on the neurochemistry basis of seizure by D B Tower The last sections concern surgical series in temporal lobe epilepsy and clinical aftermaths of temporal lobectomy H Kluver discusses the temporal lobe syndrome and W A Falconer s presentation of his series of temporal lobe surgery reflects meticulous masterful work and valid evaluation This excellent book is strongly *recommended* reading for all students of neurology neurosurgery and psychiatry —*THEODORE M. BADGLEY Maj MC USA*

THE AMPHETAMINES Th r A ti nd U by *Ch y D L k* Ph D Am L tur Se P bl t N 338 A M g ph Th B D n f Ame Le tur Pl m l gy 167 p g Ch l C Thom P bl h Sp gf ld Ill 1958 P $4 50

Profe or Leake has had th rare opportunity of observing at first hand th development of the amphetam nes from the beginning of their early pharmacological trials up to their present wide use In this small volume he has written a concise summary of our present know ledge of both isomers of amphetamine of methyl amphetamine and of a few closely rel ted compounds The book is not intended primarily for the pharmacologist but for the practicing physician and for the lawyer sociologist and psychologist Accordingly less than one third of the space is devoted to pharmacological aspects and the chapters of the th apeutic uses and on the sociologic aspects each comprise most of the rem nder There are almost 300 well chosen references Because the book is concerned enti ely with the amphet am nes the chapt on ther p utic uses does not attempt to give a balanced view Perhaps of greater alue is the chapter on sociologic aspects w ith di cu sio s of addicti n use in sports pep pills and legal restrict ons on amphetamines

—*PAUL K. SMITH C I USAFR*

CARDIAC ARREST AND RESUSCITATION by *H gh E St ph J* M D 378 p g ll t t d Th C V M by C mp y St L M 1958. P $12

This class c contributio s a great tribute to the uthor who has c rried the stimulu which has resulted in the analysis in over 1 700 cases in which cardiac arrest and res sc tation has been the major issue He began this work during his r s dency and h s contin ed it as he h s become a professor of surgery The book s a comprehen si e clear and refreshing analysis of all phases of this problem with emph sis placed upon the common simple problems of pre ention Encouragement is g en to those who have the strengt to defer sur g cal op rat on even though the patient h arri ed at the operating room if atypical symptoms and findings are present or develop early during the anesthes a wh ch ndicate an added probability of cardiac arrest *The cardiac arrest reg stry is brought to proper light in this* outst nding book Considerable emphasis is placed upon the mech ani m of ventricular fibrillation and the great strides which ha e been made in man gement of this problem are clearly pres nted A portion of the book which is of mor th n passing interest to all geons d als with the med colegal aspects of cardiac arrest nd citation It i ably pre e ted by c ntributing author Elwyn L dy Jr A a reference this volume is recommended to all en- g ged in the pract ce of surgery and a m st for all of those who de ote appreciable i terest to the area of thoracic and cardiac p ry —*JAMES H FORSEE B g G n MC USA*

New Books

THE SYMPTOM AS COMMUNICATION IN SCHIZOPHRENIA edited by Lt Colonel Kenneth L. Artiss MC USA 233 pages Grune & Stratton Inc New York N Y 1959 Price $5 75

ATOMIC MEDICINE edited by *Charles F Behrers* M D F A C P 3d edition 705 pages illustrated The Williams & Wilkins Co Baltimore Md 1959 Price $15

DISEASES OF THE COLON AND ANOPECTUM Volumes I and II edited by *Robert Turell* M D 1 238 pages illustrated W B Saunders Co Philadelphia Pa. 1959 Price $35 for set of two volumes

DENTAL MEDICAL EMERGENCIES AND COMPLICATIONS by *Ira Jay Beer love* D D S M D F A C D F I C S 380 pages The Year Book Publishers Inc Chicago Ill 1959 Price $7 0

THERAPEUTIC RADIOLOGY Rationale Technique Results By *William T* M s M D 403 pages illustrated C V Mosby Company St. Louis Mo 1959 Price $12 50

CANCER Diagnosis and Treatment edited by *John B. Field* M D Ph D with 8 contributors 796 pages illustrated Little Brown & Co Boston Mass 1959 Price $18 50

PSYCHOLOGY OF PERSONALITY edited by *J J McCary* Ph D, with six contributors 383 pages Grove Press Inc New York N Y 1959 Price $1 95

BLEEDING ESOPHAGEAL VARICES by *Hirsch Pobl Liebowitz* M D with a Section on Treatment in collaboration with *Louis M Puestel* M D M S Med Sc D F A C S 986 pages illustrated Charles C Thomas Publisher Springfield Ill 1959 Price $24 50

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THE TREATMENT OF DIABETES MELLITUS edited by *Elliot P Joslin* A M M D Sc D *Howard F Root* M D, H H D *Priscilla White* M D Sc D and *Alexander Marble* A M M D 10th Ed revised 709 pp illustrated Lea & Febiger Philadelphia Pa 1959 Price $10 50

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TEXTBOOK OF MICROBIOLOGY by *William Burrows* Ph D with the collaboration of *Richard Janvier Porter* Ph D and *James William Moffett* Ph D 17th edition 954 pages illustrated W B Saunders Company Philadelphia Pa 1959 Price $14

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GYNECOLOGY AND CYTOLOGIC PUBLISHED by *Emanuel Miller* M D and *Harry Avery* A B B with a chapter on the Cytology Teaching Room by *Willard Quack* Ph B Edited Foreword on The Psychosomatic Approach to Gynecology by *Stanley* M D 4th edition 501 pages illustrated W B Saunders Philadelphia Pa 1959 Price $5 50

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THE YEAR BOOK OF OPTHALMOLOGY (1958 1959 Y B k S) ed t d by *D rr k V l* B A M D D Oph (O) F A C S. F R C S (Hon) 40 p g s ll t ed Th Y ar B k Publ h In p ed Ch g Ill 1959 Pr $7 50

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Cabot R C Pernicious and secondary anemia chlorosis and leukemia In Osler W (editor) *Modern Medicine* 3d edition Lea & Febiger Philadelphia Pa 1927 Vol pp 33–100

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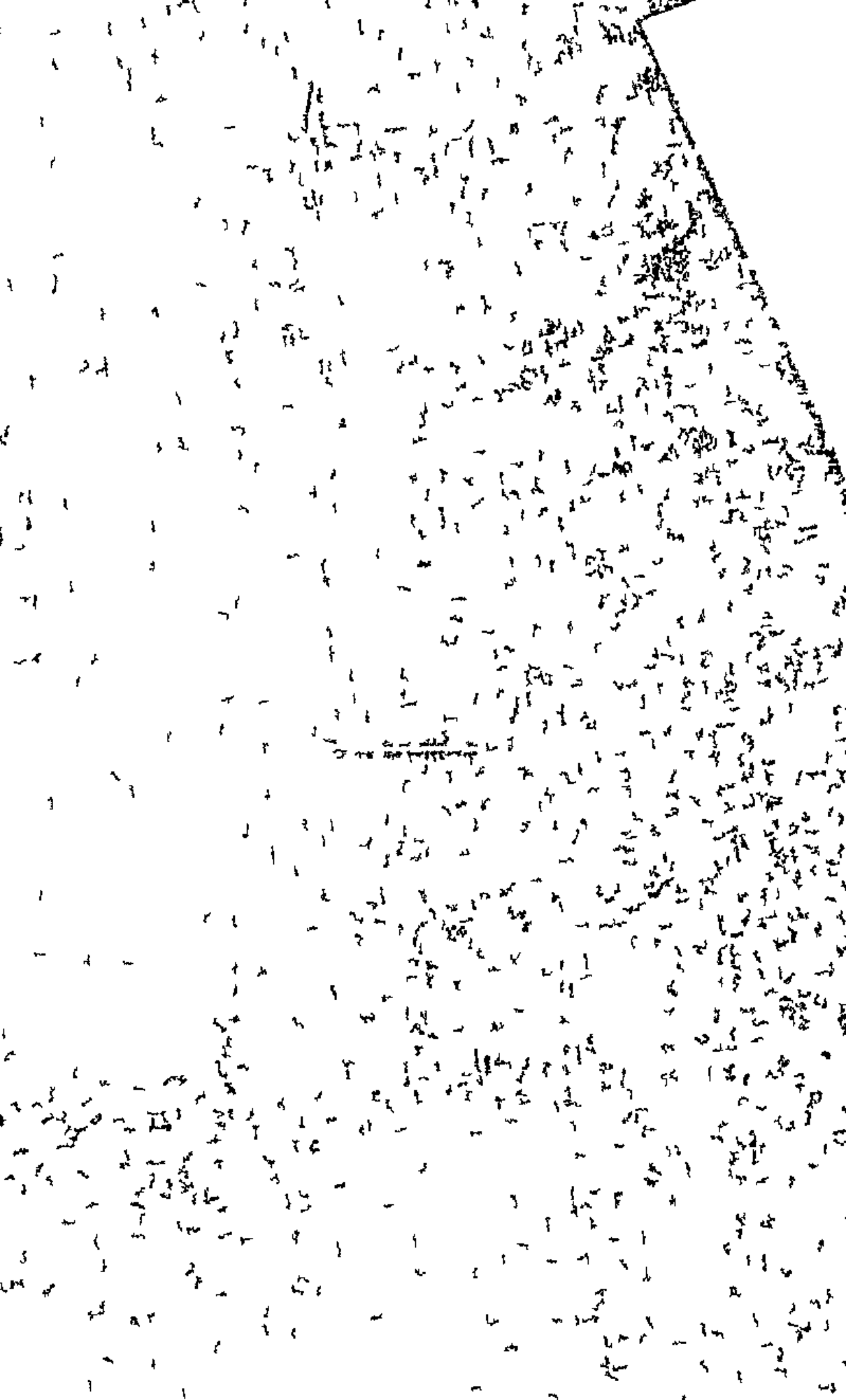
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Foreword

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FRANK B BERRY M D
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MAJOR GENERAL LEONARD D HEATON
S g G l U t d St t A my

REAR ADMIRAL BARTHOLOMEW W HOGAN
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MAJOR GENERAL OLIVER K NIESS
S g G l U t d St t A F

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THE DIAGNOSIS OF ASIAN INFLUENZA VIRUS INFECTION AFTER RECENT IMMUNIZATION

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THE antigenic composition of the Asian influenza virus, characterized by this and other laboratories in the spring of 1957 was found to vary radically from the Type A, A and swine strains of previous years [1-3] Furthermore serologic survey of the population at large showed that few people possessed antibody to the Asian variant[1-3] and emphasized the desirability of immunization prior to the fall winter respiratory disease season Widespread administration of monovalent Asian vaccine to military populations began in September 1957 coincident with the epidemic dissemination of the Asian virus in many areas The antibody responses to the Asian influenza infection and to vaccination with this strain were incompletely studied and it was not known how almost simultaneous infection and immunization would affect the immune response To evaluate this problem a group of influenza patients many of whom had been immunized shortly before disease were studied in October 1957 It is the purpose of this report to describe the problems of serologic diagnosis of influenza in these patients and to compare the antibody responses observed in patients with or

From the Department of Virus and Rickettsial Diseases Walter Reed Army Institute of Research Washington D C Presented to U S Army Medical Research Laboratory Fort Knox Kentucky Requests for reprints should be addressed to Walter Reed Army Institute of Research

without previou vaccination to the respon e resulting from vac cination alone

METHODS AND MATERIALS

Patients with influenza Between 8 96 October 1957 and coin cident with the peak of the influenza epidemic in Washington 48 patients were admitted to a special ward at Walter Reed Army Hos pital with clinical influenza Paired serums and throat washings were obtained from 4 of these patients Patients were male en listed military personnel between the ages of 17 and 44 years All were in good health prior to onset of present illness and only 3 gave a hi tory of pre existing disease (with hepatic cirrhosis and 1 with bronchiectasis) All but 11 had received monovalent Asian influenza vaccine 4 to 40 days prior to onset of clinical in fluenza The patients were hospitalized between the 1st and 8th day after onset (only 4 were admitted after the 4th day of disease) and were attended by one physician Treatment consisted of bed rest only no antipyretics or antibiotics were administered except to one patient who developed bacterial pneumonia on the d day of di ea e

All patients had one or more of the following complaints on admis ion cough headache myalgia chills feverishness, and sore throat All were acutely ill and febrile with significant physical findings in the majority of patients limited to pharyngitis and conjunctivitis In one patient pulmonary rales were heard on admission three patients subsequently developed rales be tween the third and sixth days of disease White blood cell counts on admission ranged from 3 800 to 18 000 per μl with a median value of 6 100 per μl Roentgenograms of the chest were ob tained on all patients on admission evidence of pneumonia was found in the roentgeno ram of only one patient This unvac cinated patient was the only one with rales on admis ion and as indicated above had a concomitant hemolytic staphylococcal pneumonia in addition to proven influenza No other complications were observed in the patients and except for this patient with pneumonia all patients were asymptomatic within two weeks of onset

Acute erum pecimens and throat washings were obtained *on all 4 patient on admi sion (table 1)* Serums were tored at 0 C and throat washings at 70 C until studied Convalescent r were obtained between the 13th and 30th days of disease in all patients except one on whom a convalescent serum was dr n t the 9th day of di ease Later convale cent serums t 10 we ft r on et of disea e were obtained from but 11 of t patient

Ser from 4 or al olunteers were drawn before and three week a ter vaccin ti with monovalent Asian influenza vaccine in Augu t 19

TABLE 1 *Chro l g d b on f um and throa w b g p m from p nt b l l fl en 1957*

V ar at	Spe	N mb f p w h ru d ared d y f d						
		1 4	5 8	9-12	13 16	17 20	21 24	25 28	29-30
U ar d (G p I—11 par en)	ut m d hr wa h g on I ru	11		1	8	1		1	
V ared 3 k pr II (Gro p II—11 P)	and hr wa h con t	10	1		9	2			
V ar d 3 w k p II (G p III—20 par)	cu um and hroa wa h g wal scen erum	18	2		17	1	1		1

Laboratory Studies

Serologic tests Hemagglutinating antigens were simple infected allantoic fluids (table 2) each was prepared from low egg passage virus[1 4~] and was relatively insensitive to normal serum inhibitors Untreated serums from each patient were tested

TABLE 2 *Ant gens u ed for serolog c diagn s s of influenza*

Study R P	T t and typ f tig		
	HI	CF	
	All t fl d	V&S (Ch ll t c fl d)	S(Ch r ll t fluid) V&S(All t c fluid)
P t	A FRS A FLW 1 52 A Form 313-57[4] (4th RR P R) B IB1 50[6]	A J p 305-5[~4] B-V R t 301 55	A J p 305 5 B V rR 301 55
V l	A J p 305 57 (5th RR P R)		A J p n 305-57 B V rain 301 55

T t R hum O c lls.
( ) t l R pr mary i c h tion f 75 t 37°C
! l f d CF t t u. li ing pr mary i cub t n of 16-18 hours t 4°C.

Unvaccinated patients (Group I) A serologic diagnosis of influenza was achieved in 9 of 11 patients by HI test and in 10 of 11 patients by CF test with the V&S antigen Significant HI or CF antibody increases were not demonstrated in the convalescent serum (17th day of disease) in one case A late convalescent serum (38th day) obtained from this patient demonstrated a fourfold increase in both HI and CF antibodies Thus serologic proof of infection was obtained for each patient in this group Influenza virus was isolated from the throat washings of 8 of 11 patients While contributing nothing more to the frequency of diagnosis virus isolations established a specific diagnosis of Asian influenza in one instance when the HI test was negative

Vaccinated patients (Groups II and III) In vaccinated patients serologic diagnosis of influenza was more difficult to interpret and fewer definitive diagnoses were made by serologic tests alone Of 11 patients vaccinated 21 or more days prior to illness (Group II) fourfold increases in both HI and CF antibodies occurred in only 4 patients and virus was isolated from 3 of these (table 3) Four additional patients virus isolated from 3 showed significant increases in HI but not CF antibody In 1 other case significant increase in CF antibody only was demonstrated In the remaining 2 patients HI CF and virus isolation tests yielded no diagnosis

In Group III (20 patients vaccinated less than 21 days prior to illness) fourfold increases in HI and CF antibody were demonstrated in but 6 patients HI antibody alone increased in another 4 and the CF test alone provided 2 additional diagnoses Thus even fewer serologic diagnoses were obtained in this group It is likely that the increases in HI antibody were due to infection since virus was isolated from 5 of the 10 patients demonstrating HI antibody increases Because of recent vaccination however HI test could not be used for diagnosis

Because increases in CF antibody have been reported to occur only rarely following influenza immunization,[1] the CF test was used for the conclusive diagnosis of infection in this group Fourfold or greater increases in CF antibody were demonstrated in only 8 of 20 patients However influenza virus was isolated from of the remaining 12 patients who failed to show significant increases in CF antibody Thus in Group III virus was isolated from 11 of 18 throat washings (61 per cent) Combining this finding with the 8 significant increases in CF antibody Asian influenza was confirmed in 15 of 20 patients (75 per cent)

Heterologous antibody responses HI antibodies for PR 8 FLW 1 [illegible] IB1 were present in the acute and convalescent [illegible] patient Fourfold or greater HI antibody increases were demonstrated in 3 cases and to

FLW 1 52 in 2 cases The magnitude of these heterotypic antibody increases was less than those shown to A Formosa 313 57, and was independent of vaccination history Similar heterotypic responses were observed by this laboratory during the winter of 1957 when fourfold or greater increases of HI antibody were demonstrated to PR 8 in 9 per cent and to FLW 1 52 in 3 per cent of patients at large with proved Asian influenza No significant increases in HI or CF antibody to type B influenza virus or in CF antibody to adenoviruses were shown in the patients of this series

Effect of vaccination on recovery of virus Although the frequency of serologic diagnoses differs markedly among the three groups, the recovery of virus was not influenced by immunization Asian influenza virus was isolated from 62 per cent of all patients (8/11 in Group I, 6/11 in Group II, and 11/18 in Group III), this is approximately the same percentage of isolations achieved by this laboratory in the routine diagnosis of Asian influenza during the same season No additional isolations were achieved using the red blood cell adsorption method to concentrate virus particles

TABLE 4 *Magnitude of HI and CF antibody increases clinical fluenza*

Vaccination status	Number of patients	Antibody	Number of individuals showing indicated fold antibody rise							
			0	2	4	8	16	32	64	128
Unvaccinated (Group I)	11	HI	2	0	7	1	0	1	0	0
		CF	0	1	5	2	2	0	0	1
Vaccinated >3 weeks prior to illness (Group II)	11	HI	1	3	3	2	2	0	0	0
		CF	2	4	4	1	0	0	0	0
Vaccinated <3 weeks prior to illness (Group III)	20	HI	4	6	5	4	1	0	0	0
		CF	3	9	6	1	1	0	0	0

Effect of vaccination on serologic diagnosis Generally, the maximal titers of HI and CF antibody attained by the 35th day of disease in unvaccinated patients seldom exceeded 1 80 and were lower than those observed by others in the influenza A infections of previous years [11] The fold increases in antibody as measured by both tests in this group were similarly of low order (table 4) and only occasionally were greater than eightfold In the vaccinated patients, maximal titers achieved by the 35th day were not greatly different from those in Group I Because

acute phase serum titers of both HI and CF antibody tended to be higher in vaccinated individuals (table) increase in either antibody after infection was of lower order than in unvaccinated patients (table 4)

TABLE 5 *Illustration* ... *antibody titer* ... *m*

Vaccination status	Acute titer of									
	HI antibody					CF antibody				
	<5	5	10	20	40	<5	5	10	20	40
Unvaccinated (Group I)	8	2		1		6	3	2		
Vaccinated >3 wks prior to illness (Group II)	1	1	3	3			3	4	4	
Vaccinated <3 wks prior to illness (Group III)	6	2	6	5	1	3	6	7	3	1

The failure to demonstrate a significant CF antibody increase in 16 of 31 (8 per cent) and of HI antibody in 13 of 31 (4[illegible] per cent) of vaccinated patients (Groups II and III table 3) was unexpected and was not readily explained Two explanations seemed possible First antibody response may have been incomplete by the 30th day after infection Accordingly late convalescent serum were obtained from patients of Groups II and III upon whom no serologic diagnosis had been made with sera obtained between 13 and 30 days after onset In none of 10 patients with convalescent serums obtained between 67 and 7[illegible] days after onset were further significant increases or decreases in HI or CF antibody demonstrated

Second the antibody evoked by vaccination may have prevented demonstration of further increase resulting from infection In as much as most patients exhibited the minimal antibody increase considered significant (fourfold) of infection (table 4) it might not have been possible to show further increase in antibody required for diagnosis Table [illegible] which summarizes the results [illegible] patients clearly shows that the success or failure of [illegible] in the diagnoses of Asian influenza was influenced [illegible] acute serum antibody titer Thus the frequency [illegible] which [illegible] diagnoses were made by HI or CF to [illegible] decreased [illegible] increase [illegible] serum titer

[illegible] [illegible] [illegible] [illegible] higher titer of HI and CF antibody [illegible] of vaccinated patients were [illegible] [illegible] HI antibodies are evoked

by vaccination with Asian influenza vaccine is a well documented phenomenon [13] The data presented in table 5 suggested that Asian influenza vaccine induced CF antibodies to the combined V&S antigen used Since CF antibody resulting from immuni

TABLE 6 *Titers of antibody after vaccination with bivalent*

	Antigen									
	HI antibody					CF antibody				
	<5	5	10	20	40	<5	5	10	20	40
Number of persons with titer	15	8	9	6	4	9	12	13		1
Number who had a fourfold or greater	14	6	6		2	9	8	5	1	0
Decimal fraction	0 93	0 75	0 66	0 33	0 50	1 00	0 75	0 38	0 14	00

zation is said to be evoked primarily by the V antigen [11] serums from the 18 patients in Groups II and III without significant CF antibody increases were tested with the purified S antigen to determine whether acute serum titers would be lower Simultaneous tests with V&S antigen (allantoic fluid) were also performed In 5 of the 18 serum pairs a fourfold increase in antibody to the S antigen was demonstrated However in 6 of the same 18 serum pairs a fourfold increase in antibody to the combined V&S antigen was demonstrated Inasmuch as 13 of the 18 patients had already shown a *twofold* increase in CF antibodies in the initial test (table 4) the fourfold increases shown in 6 patients on repeat testing may be accounted for by the increased sensitivity of the CF test resulting from overnight incubation of serum and antigen Acute serum titers obtained with the S antigen were not significantly lower than those found with the combined antigen suggesting that considerable [illegible] antigen was produced by vaccination That this was actually the case was established by study of 47 pairs of serum [illegible] military volunteers who received by a subcutaneous route 0 5 ml of vaccine containing 250 CCA units of virus per milliliter

The HI and CF antibody responses resulting from [illegible] stration of 250 CCA units of vaccine were [illegible]

is comparable to that received by the patients in this study The incidence of fourfold or greater increases in CF antibody following vaccination (4 per cent) was less than the incidence of significant HI antibody increases (51 per cent) However titers of CF antibody following vaccination were essentially the same whether measured by V&S or S antigen (table 7) and

TABLE 7 *HI and CF body pon acc on 47 ol er g 50 CCA f A ll*

Serum	N b f lun ho g 1 ed f													
	HI b dy						CF an body							
							V & S				S			
	<5	5	10	20	40	80	<5	5	10	20	<5	5	10	20
P	21	15	11				24	15	8		24	10	11	2
P (3 w k)	6	3	17	10	9	2	14	18	14	1	12	16	12	7

a twofold increase in CF antibody was demonstrated in 38 per cent (18 of 47) tested with the V&S antigen and in 49 per cent (93 of 47) tested with the S antigen In a situation where anti body response to infection is low antibody response to im munization even of a twofold magnitude might obscure what other wise would be a fourfold increase in antibody diagnostic of infection Because of the high frequency of antibody to S antigen following immunization the use of the CF te t was of no value in differentiating immunization response from response to in fection with Asian influenza virus

DISCUSSION

Widespread disease with the new antigenic variant of influenza brought with it problems in laboratory diagnosis Prior to the Asian influenza epidemic it was shown that the general popu lation had a striking lack of previous experience with the new

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Th qua y f 1 bl an g d b h m h g h m CCA un on b pur f d by d ff m h d Th 1 bl g h 250 CCA un (Sh pl pur f hn) dmi d h l d b w f und 1 4 h p f 2 un f hum l m h 1 bl g h 200 CCA (l p f m h d) dmin d h m j y f p h udy w f und 1 16 h p f 2 un f h m t m H gh l l f CF body l bl w uld b d h f d dual immun d w h h l han wi h h f m lf d dual b h g p w f ct d h ll f mm f d g wi h h CF w uld b d h g p h g h h gh f l bl g

virus [1 14] The magnitude of antibody response to infection with a virus of new antigenic configuration (Asian influenza virus) might be less than the response induced by infection with older strains (A, A , or B influenza virus), and in the fall of 1957 when this "virginal" population was exposed to the Asian virus, this low magnitude response was confirmed

The patients in this study represented a small homogeneous group clinically all had influenza and no difference in clinical disease was noted between the vaccinated and unvaccinated patients They were in the vanguard of influenza cases and it can be assumed that none had prior experience with the new antigen except in some cases by vaccination Despite the low magnitude of antibody response to infection, serologic diagnosis was highly successful in unvaccinated patients with influenza infection, and the HI and CF tests were of equal efficacy In the patients vaccinated greater than 3 weeks prior to onset of illness, it seemed unlikely that HI antibodies due to immuni zation alone would develop in the interval between acute and convalescent sera However when results of the HI test were considered in this group the serologic procedures yielded fewer diagnoses In the group vaccinated less than 3 weeks prior to onset of disease the HI test results could not be considered, and the CF test demonstrated so few significant antibody in creases that isolation studies had to be relied upon for the majority of diagnoses

The reasons for this failure of serologic technics in the diag nosis of Asian influenza infection following immunization were not due to the poor timing of convalescent serums since the early convalescent serums drawn 9 to 26 days after onset of illness yielded a serologic diagnosis in 10 of 11 unvaccinated patients and no additional diagnoses were obtained in 10 vac cinated patients from whom late convalescent serums were drawn The failure of the serologic tests seemed related to vaccination

Immunization with the Asian vaccine may elicit antibody yet fail to protect against disease This antibody may seriously interfere with the serologic diagnosis of influenza infection in immunized patients It has been shown that the failure to demon strate antibody increases was due in part to the CF and HI anti body titers in the acute serum and that the use of purified "soluble" CF antigen did not reduce these titers However the dual stimuli of infection and immunization would be expected to produce higher CF and HI antibody titers in the convalescent serum than were demonstrated One may speculate that infection with the Asian influenza virus during the period of antibody response to vaccination may have caused an inhibition of anti body production by any of several mechanisms, none of which can be substantiated by the data at hand

The majority of people have now been exposed to the new variant of influenza If past experience with influenza is repeated the Asian family of type A influenza will probably show minor antigenic alterations as did the A family when in 1952 the FM1 47 subgroup was replaced by the Scandinavian 53 subgroup and again in 1956 when the Dutch 56 subgroup became prevalent Under these circumstances further epidemics of infection with the Asian strains would be expected to yield antibody responses analogous to those produced by infection with other type A influenza viruses where the high magnitude of response facilitates serologic diagnosis The CF test under these circumstances might be able to differentiate meager CF antibody response to immunization from marked response to infection However marked antigenic shifts of type A influenza virus similar to that which occurred in 1957 will undoubtedly take place giving rise to future epidemics in the virgin population At that time last fall s race between the rapid spread of the new virus and the production and administration of vaccine for the control of disease will be repeated At this time a repetition of these problems in the laboratory diagnosis of influenza can be anticipated

SUMMARY

Forty two cases of clinical Asian influenza virus infection occurring during the immunization program and at the onset of the 1957 influenza epidemic were studied to evaluate the efficacy of laboratory technics for the diagnosis of Asian influenza CF and HI tests yielded a high percentage of positive diagnoses in nonimmunized patients but neither serologic test proved effective in the diagnosis of influenza in those patients who developed the disease shortly after immunization Isolation of the virus from throat washings was found to be of value in establishing the diagnosis in immunized patients but this procedure was effective in less than two thirds of the cases of influenza The failure of serologic diagno is in recently immunized patients was shown to be due in part to the low magnitude of antibody response to infection with the new variant combined with the development of both CF and HI antibodies in response to immunization The use of the purified soluble antigen to differentiate antibody elicited in response to infection from antibody elicited in response to vaccination was found to be of no value since the Asian vaccines contained significant quantities of soluble" CF antigen Studies on volunteers who received vaccine in the summer of 1957 confirmed these findin s The possible future antibody responses to infection with Asian type influenza viruses and the probable recurrence of these problems in the diagno is of influenza are discussed

ACKNOWLEDGMENTS The authors are indebted to Captain Everett Cooper MC USA Walter Reed Army Hospital for the clinical information and assistance in obtaining specimens from the patients and to Captain Frederick J Flatley MC USA and Dr Maurice R Hilleman who obtained serums from the volunteers

REFERENCES

1 Myer H M Jr Hilleman M R Mi M L Cr wford I P and B nkh ad A. S New antigen c varia t i Far F st nfl n pidem c 1957 *Proc Soc Exper B ol & Med* 95 609-616 July 1957

2 Je sen K E N w set of Type A Influ nza iruses *J A M A* 164 2025-2029 Aug 31 1957

3 Zhdanov V M R to a V V Orlo A V Sokol a N N Ch ract r tic of nfl enza virus tra n solat d in 1957 *Lancet* 2 735 736 12 O t 1957

4 Hill ma M R Fl tl y F J And rs n S A L ecking M L d Le inson D J Ant b dy re p ns v l nteers to Asi i fl e v ccin *J A M A.* 166 1134 1140 Mar 8 1958

5 F cis T Jr *Immun log cal relat nship of str i of filtr ble vir s reco ered fr m c s f h man fl n a P oc S c Exper B ol & Med* 32 1172 1175 Apr 1935

6 H ll man M R M s n R P and B escher E L A tigenic pattern of strain of nfl A and B *Proc Soc Exper B l & Med.* 75 829-835 D c 1950

7 C mm tt o St d rd S l g c l Pr c dures n Influe z Stud s Aggl t natio inh b t o t st pr po d a t d rd of ref ce i i fl di gnostic stud s *J Immunol* 65 347 353 S pt 1950

8 H llem M R a d W m r J H R co e y f w gent fr m pat e ts w th cut t spir t ry ll *Proc Soc Exp B ol & Med.* 85 183-188 J 1954

9 Hir t G K D r ct s l t f h m fl iru i h k embry *J Immunol* 45 293 302 Dec 1942

10 Ha ks J H and W ll c R E Rel ti f oxyge d t mp r ture i p eser t f t ue by ref g r t *Proc Soc Exper B ol & M d.* 71 196-200 Jun 1949

11 J K E I fl a *Diagn st c Proc dur J V rus and Rick ttsial Disease* 2 d d p 254 Am Publ H lth A ti N w Y rk N Y 1956

12 W M H l W d H nl G St d o c mpl m t f t t gen of i fl e irus typ A d B *J Exper Med.* 83 259-279 Ap 1946

13 C mm I fl f th A m d F Ep d m l g c l B rd V t Ag i t A nfl b f omm d t and p l m y p t f f y *J A. M A* 165 2055 2058 D 21 1957

14 H ll m M R Fl l y F J A d S A L k g M L d L D J D tr b t d g f f A d h fl t b d h m p pul t *New England J M d* 258 969-974 M y 15 1958

DANGERS OF ANTIBIOTIC THERAPY

It is my opinion that the three major hazards of antibiotic therapy are anaphylactic reactions superimposed staphylococcic infections and blood dyscrasia Although many of the antibiotics have been incriminated in all of these hazards the evidence suggests that serious and often fatal anaphylactic reactions are most common after the administration of procaine penicillin G by the intramuscular route serious and often fatal superimposed staphylococcic infections largely a problem in hospitalized patients are due at least in part to the widespread use of the broad spectrum antibiotics and serious and often fatal blood dyscrasia occurs most frequently after the administration of chloramphenicol —Wallace P Herrell Hazards of Antibiotic Therapy *Journal of the American Medical Association* December 6 1958

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EFFECTIVENESS OF INFLUENZA VACCINES DURING AN EPIDEMIC OF ASIAN INFLUENZA

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THE identification of a new antigenic variant of influenza virus of the A group from epidemics occurrin_ in the Far East in April and May 1957 permitted a revision in the antigenic composition of influenza vaccines before their anticipated use during the fall and winter The new Asian viruses were found to be sufficiently different antigenically from previous ly known influenza viruses of the A type to indicate that vac cines containing the older antigens might provide little if any protection against illness due to the new strain By early sum mer of 1957 it was evident that the Asian strain of influenza was being disseminated throughout the world and influenza epidemics were expected Since vaccination is the only practical method known for the control of influenza great efforts were made to prepare and distribute influenza vaccines containing the new antigen

In June 1957 influenza outbreal s occurred aboard ships of the United States Atlantic Fleet operating out of Newport Rl ode Island and at a Navy installation in California Because of the continual interchange of Navy personnel between duty stations it was expected that a summer or early fall epidemic might oc cur at the United States Naval Training Center Great Lakes Illinois Therefore a controlled study was initiated on July 1 1957 to determine whether or not a commercially prepared in activated monovalent Asian strain influenza vaccine would prevent the epidemic disease It was also considered desirable to determine whether or not a polyvalent influenza vaccine that

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1012 N mb 20 1958

had been in use in the military services during the winter of 1956 57 and did not contain antigens derived from the Asian strain of influenza virus would provide any protection against or modification of Asian influenza

A sharp epidemic of influenza occurred in early October, 1957, at Great Lakes, Illinois Although the vaccine evaluations were initiated on July 1, only the men entering the study between August 10 and September 21 were under observation during the epidemic These men constitute the study population of this report The results of these observations indicate that a high degree of protection against influenza during the epidemic was provided by the monovalent Asian strain influenza vaccine and suggest that some protection may have resulted from the use of the polyvalent influenza vaccine

MATERIALS AND METHODS

Vaccine A

Approximately 30 per cent of the incoming recruits were given a 1 ml subcutaneous inoculation of monovalent influenza virus vaccine (A/JAPAN/305 57) reported by the manufacturer* to contain 200 CCA (chick cell agglutinating) units per milliliter Two separate lots of this vaccine were used The first lot was prepared by concentration of the virus contained in chick embryo allantoic fluid a calculated twenty two times by ultracentrifugation and inactivation by ultraviolet irradiation Thimerosal, 1 10 000 solution, was added as a preservative The second lot was prepared in a similar fashion, and adsorbed on calcium phosphate Since the analysis of results yielded no evidence of a difference in protection against illness between the groups of men receiving the two lots of vaccine, no further distinction between the lots is made

Vaccine B

Another approximate 30 per cent of the incoming recruits were given a 1 ml subcutaneous inoculation of polyvalent influenza vaccine containing 250 CCA units each of formalin inactivated A/Swine A /ΓM1 and B/GL/1739 54 viruses This vaccine had been used by the armed forces during the winter season of 1956 57

Control

The remaining approximate 40 per cent of the incoming recruits were given an inoculation of material not containing influenza vaccine A formalin inactivated trivalent vaccine* con

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training antigens of Types 3 4 and 7 adenovirus es was also being evaluated in this population Thirty three per cent of the men inoculated with vaccine A and 32 per cent of those inoculated with vaccine B were also inoculated subcutaneously with 1 0 ml of the trivalent adenovirus vaccine Thirty per cent of the control group received the adenovirus vaccine and the other 70 per cent a placebo inoculation of formalin maintenance medium 199 Since the three groups receiving either vaccine A or vaccine B or a noninfluenza inoculation were similar in the proportion of men in each group who also received the adenovirus vaccine any differences observed in the illness experience would be due presumably to the action of the influenza vaccines Therefore the men who did not receive an influenza vaccine are considered as controls for the men who received either vaccine A or vaccine B An analysis of the adenovirus vaccine evaluation will be the subject of a separate report

The inoculations were given by personnel of the Medical Research Unit three or four days (or more when weekends and holidays intervened) after the arrival of the men at Great Lakes The inoculation each man received was determined by a random selection process so that about 30 per cent 30 per cent and 40 per cent of the men were assigned to the vaccine A vaccine B and control groups respectively Neither the recruits nor the administrative and medical personnel of the Recruit Training Command had any knowledge of the study vaccine status of a particular man during his nine weeks of recruit training A total of 450 men were excluded from this study because they did not choose to participate claimed to be sensitive to fowl products or were detained over a week in their pretraining processing for various administrative or medical reasons Thus the study population consisted of 3355 Navy recruits who arrived at Great Lakes between August 7 and September 18 1957 and who were not excluded for the reasons stated above At its maximum strength of 3 55 men the study population was somewhat less than half the total number of recruits in training After the completion of inoculations by the Medical Research Unit on September 21 all further non egg sensitive incoming recruits were subsequently inoculated with an Asian strain of influenza virus vaccine These together with recruits arriving before August 7 are not included in the study

Recruits in training may attend the infirmary at their option A record is kept of each visit or report to the infirmary The reported illness experience of the study population was classified by a review of these official records Each illness was classified as respiratory or nonrespiratory on the basis of the information contained in the infirmary records or by a medical officer diagnosis in hospitalized patients Many men reported

to the infirmaries several times with similar illnesses These reports were considered manifestations of one illness episode if they occurred within seven days of a previous report for a similar illness The following was noted for each illness episode the maximum temperature recorded during the episode the duration the number of reports and whether hospitalization was required Respiratory illnesses were classified as febrile or afebrile depending on whether the maximum recorded temperature during the illness was greater or less than 100°F by mouth Hospitalized patients with respiratory illnesses were included in the febrile category since only on a rare occasion did such a patient have a temperature less than 100°F by mouth Because of the unreliability of distinguishing between influenza and some other acute respiratory disease on clinical grounds, no attempt was made to classify these illnesses further A period of about two weeks has been thought to be required before an influenza vaccine could be expected to afford protection Therefore, illnesses in the vaccine and control groups were classified as occurring either less or more than two weeks after inoculation

RESULTS

Figure 1 shows the reported rates for febrile respiratory illness in each vaccine group during each week of the study period of August 10 to November 9 excluding illnesses reported within two weeks of vaccination The populations at risk averaged about 50 men per group for the first week and about 170 men per group during the week ending September 7 Then the populations increased to an average of about 1000 men per group by the week ending October 12 after which they declined to about 500 per group by the week ending November 9 The highest rates of illness were noted during the weeks ending October 5 and 12 At this time all other major population groups at Great Lakes experienced elevated rates of hospitalizations for respiratory illness many of which were the highest since records were kept by this unit (since 1948)

Paired serum specimens were obtained from a few recruit patients of the control group who were hospitalized for respiratory illness and were titrated by the complement fixation test to the Asian strain of influenza virus (A/JAPAN/305 57) The pairs showing fourfold or greater titer rises increased from 54 per cent early in September (13 pairs) to 67 per cent in the last week of September (9 pairs) and to 100 per cent for the first week of October (10 pairs) Influenza viruses antigenically similar to the Asian strains were isolated from throat specimens of men who showed rises in influenza antibody titer

training antigens of Types 3 4 and 7 adenoviruses was also being evaluated in this population Thirty three per cent of the men inoculated with vaccine A and 32 per cent of those inoculated with vaccine B were also inoculated subcutaneously with 1 0 ml of the trivalent adenovirus vaccine Thirty per cent of the control group received the adenovirus vaccine and the other 70 per cent a placebo inoculation of formalin maintenance medium 199 Since the three groups receiving either vaccine A or vaccine B or a noninfluenza inoculation were similar in the proportion of men in each group who also received the adenovirus vaccine any differences observed in the illness experience would be due presumably to the action of the influenza vaccines Therefore the men who did not receive an influenza vaccine are considered as controls for the men who received either vaccine A or vaccine B An analysis of the adenovirus vaccine evaluation will be the subject of a separate report

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TABLE 1 *Reported illnesses by vaccinated and control Navy recruits*

Status	Influenza vaccine group					
	A		B		Control	
	No	Rate/1000/wk	No	Rate/1000/wk	No	Rate/1000/wk
Total study period (Aug 10 to Nov 9 1957)						
Respiratory illness						
Febrile	107	16.9	390	32.7	650	37.1
Hospitalized	93	7.3	168	14.1	355	20.3
Afebrile	365	28.5	280	23.5	404	23.1
Nonrespiratory illness	234	18.3	223	18.7	287	16.4
Total no. of men at risk	994		916		1347	
Total period exclusive of data for 1st 2 wk postinoculation (Aug 25 to Nov 9 1957)						
Respiratory illness						
Febrile	152	23.5	299	19.7	513	58.9
Hospitalized	67	10.4	129	21.1	284	32.6
Afebrile	254	39.4	210	31.9	295	33.9
Nonrespiratory illness	148	23.0	153	25.1	203	23.3
Average no. of men at risk/wk	586		547		739	
Period of Sept 29 to Oct 19 1957 exclusive of data for 1st 2 wk postinoculation						
Respiratory illness						
Febrile	34	19.4	118	90.0	268	113.3
Hospitalized	13	7.4	61	39.0	171	72.4
Afebrile	71	40.6	68	41.4	85	36.0
Nonrespiratory illness	3	18.4	11	25.0	57	24.1
Average no. of men at risk/wk	871		822		1182	

The number of men initially in the study population 1017 916 and 1392 respectively in the A group Since the study was terminated in November 1957 when 360 men had been in training for 2 months or longer men in training for 1 2 months or longer were progressively reclassified

In the last weeks of September and early October rates of respiratory illness showed a sharp increase in all populations at Great Lakes recruits as well as seasoned personnel Concurrently laboratory evidence of influenza was readily available The weeks ending October 5 and October 12 are noteworthy for the highest attack rates observed in the past eight years at Great Lakes Table 1 also shows the illness experience by vaccine group for these two weeks The effectiveness of vaccine A and vaccine B in reducing febrile respiratory disease in relation to the control was found to be 83 per cent and 21 per cent respectively For hospitalized patients with respiratory disease the relative effectiveness was 90 per cent for vaccine A and 46 per cent for vaccine B

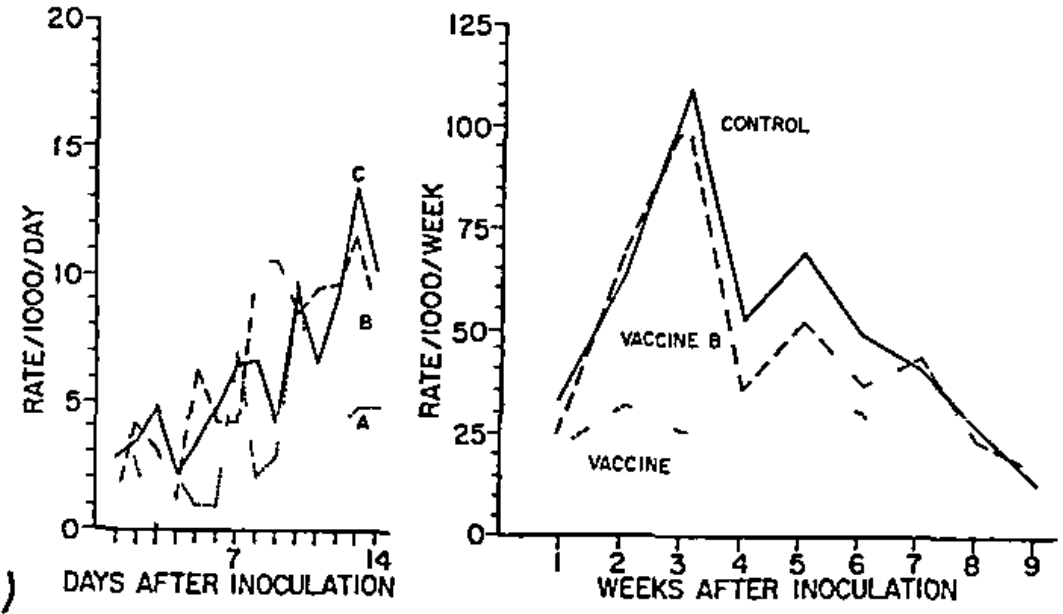


Figure 2 Reported attack rates of febrile respiratory illness recorded at time of first morning report

Rates for the reporting of febrile respiratory illness are shown on a daily basis for the first two weeks after inoculation and also weekly for the entire period men were at risk in figure 2 The group receiving vaccine A reported considerably less illness ten days after inoculation This group also reported somewhat less illness on the average in the first ten days after inoculation *The group receiving vaccine B reported illness in* a manner quite typical of the control group Although the average relative reduction in reporting illness in this group was not great it appeared that some men were benefited by this vaccine

DISCUSSION

In previously reported study of vaccinated and unvaccinated human volunteers with challenge *induced Asian influenza* 78

per cent of the control group had a febrile respiratory illness and a 44 per cent reduction in such illness was associated with vaccination.[4] On the basis of virus isolation, serologic evidence, clinical picture and incubation period, these illnesses were regarded as almost entirely due to the Asian strain of influenza virus contained in the challenge material. At Great Lakes, about half the control group reported at least one febrile respiratory illness during the study period. Undoubtedly, additional illnesses were unreported.

The occurrence of Asian influenza infections was demonstrated by the isolation of viruses and by the results of serologic tests throughout the entire period of the study. No evidence of influenza B infections was obtained. Laboratory evidence of the occurrence of infections with Type 4 adenovirus and Group A beta hemolytic streptococci was also obtained during the study. In spite of a mixture of potential pathogens, a maximum relative reduction of 83 to 90 per cent was associated with the use of the monovalent Asian strain of influenza vaccine (vaccine A). Possibly, the conditions of military training—that is, grouping of men in one age group in common housing, messing and classroom facilities—provide conditions of contact approximating those of the afore mentioned study. Under such conditions, the Asian influenza vaccine appeared to be highly efficacious in preventing naturally occurring influenza, apparently having some beneficial effect shortly after inoculation and a decided effect after ten days. These results agree with those reported from other studies.

It is interesting that the vaccine contained only 200 CCA units per milliliter. A vaccine of considerably greater CCA unitage was desired, but could not be obtained under the emergency conditions prevailing during the summer and fall of 1957. The good protective results with this vaccine suggest that the CCA unitage is only a crude index of the potency of a vaccine.

It appears that at least a small percentage of the population benefited from a vaccine containing strains other than the Asian type. Although maximum protection was associated with the use of a vaccine containing inactivated Asian strain virus, the results of these observations indicate that prior experience with other influenza virus antigens may provide some protection, suggesting some immunologic similarity between the Asian strain and other previously prevalent, influenza viruses. This study supports the generally accepted belief that antigens derived from a strain of influenza virus homologous with the epidemic strain are an essential component of an influenza vaccine of maximum prophylactic effectiveness.

SUMMARY

An epidemic of respiratory illness associated with Asian influenza occurred in early fall of 1957 at the United States Naval Training Center Great Lakes Illinois A vaccinated and control study population of 3355 Navy recruits in training as well as other populations were affected During the epidemic 83 to 90 per cent reduction in febrile respiratory illness was associated with prior inoculation with a monovalent Asian influenza vaccine containing only 900 CCA units of A/JAPAN/305 57 strain virus A similar 21 to 46 per cent reduction was associated with prior inoculation with a polyvalent influenza vaccine not containing the Asian strain Although a marked protective effect was noted as early as ten days after inoculation a slight beneficial result was noted before that time No untoward reactions to the vaccine were observed It is concluded that the Asian influenza vaccine was highly efficacious under the conditions of use at Great Lakes in the fall season of 1957

ACKNOWLEDGMENT W ar ind bt d t C pt C l E B ll USN m mand g ff Re ru t T inin g C mmand and C pt A M E klund MC USN d M d l D p rtm U t d St N l T g C t G Lake Ill f th o- pe t d Df F M D p d C mm Infl Arm d F Ep d m l g l B ard f h on t ed e t in th t dy d f p d g m f h A fl in

REFERENCES

1 M yer H M J H ll m M R M M L Cr wf d I P d B kh d A S N w g ar F E fl p d m 1957 *Pro S Exper B I & M d.* 95 609-616 1957

2 J K E N w f yp A fl *J A. M A* 164 2025 2029 1957

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4 B ll J A l Art f lly d ed A infl na d d un d lun *J A. M. A* 165 1366-1373 1957

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USE AND VALUE OF THE STEP TEST IN MILITARY PILOT SELECTION

EDGARD EVRARD *Lieutenant Colonel M decin Belgian Air Force*

IN December 1948 the step test was introduced into the medical examination given to young men applying for admission as student pilots in the Belgian Air Force For nine years this test was given to all candidate student pilots without considering the test results in the final decision of candidates fitness or unfitness for flight duty In addition this test was used in routine medical examinations of a group of student pilots during their stay at the flying training school Finally, a limited number of jet fighter pilots on active duty were tested by this method

Previous reports,[1-4] contain the preliminary results of these studies The final evaluation of the results in 3,329 subjects is presented in this article Subjects were grouped as follows (1) 3,174 young men between the ages of 17 and 24, examined at the time of their application as student military pilots (2,701 of these were declared fit for flight training), (2) 114 student pilots between the ages of 17 to 26, tested at the end of advanced training before going on to operational fighter squadrons, and (3) 41 fighter pilots between the ages of 20 and 27 actively engaged in jet flying

The procedure established at the Harvard Fatigue Laboratory[5-7] has undergone several variations but that described by Brouha, Graybiel, and Heath in 1943 was employed This procedure also was used in 1945 by Malmejac Dugue and Voisin[8] on 113 candidate student pilots at the selection center of the French Air Force at Algiers and was recommended in France by Grandpierre in 1947

Briefly as described by Brouha, Graybiel, and Heath,[5] the step test consists in having the subject step up and down a 20 inch platform 30 times a minute for 5 minutes, unless he stops from exhaustion before then The pulse is counted from 1 to 1½ minutes 2 to 2½ minutes and 3 to 3½ minutes after completion of the step test The score is obtained by dividing the duration

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of exercise by the sum of pulses in recovery according to the formula

$$\text{Index} = \frac{\text{Duration of exercise in seconds} \times 100}{\times \text{sur of pulse counts in recovery}}$$

STATISTICAL DATA

Pilots Actively Engaged in J t Fly ng

Table 1 presents the results of the step test administered to 41 jet pilots between 20 and 27 years of age These pilots had a step test index equal to or above the score of 72

Accordin to the classification set forth by the Harvard Fatigue Laboratory the pilot s physical condition is to be considered as excellent good or average The step test was applied im promptu during the course of an annual physical examination of the flying personnel and no difficulty was experienced

TABLE 1 *R lt f t p t t dm t r d t 41 f ght p l t*

S p- t d	N mb f p l t	T t l d g H d m l t
72 t 74 75 t 79	5 12	A g 17 (41%)
80 t 84 85 89	10 3	G d 13 (32%)
90 t 94 95 99 100 t 104	9 1 1	E ll t 11 (27%)

Student Pil ts at Fly ng Tr ining Sch ls

The results in 114 student pilots 17 to 26 years old who had spent 6 to 12 mont is of training in flyin, schools are shown in table 2 The step test index of these young pilots several weeks before their transfer to operational fighter squadrons wa below 75 in only 10 per cent The lowest index of all was 69 (only one case) All of the student pilots therefore were classified as excellent good or avera,e Their distribution into these three categories was about the same as that of the fighter pilots

C did t St d nt P lots

Re ults are reported on 3 174 male Belgian subjects aged 17 to 24 years (table 3) If it is true that this is a preselected group inasmuch as they were volunteers they were nevertheless representative of healthy youn, Belgians In fact this group in cluded athletes nonathletic individuals who had never partici l te l in ports intellectuals technicians workers college

TABLE 2 *Results of step test administe ed to 114 student pilots*

Step-test index	Number of student pilots	Total according to Harvard nomenclature
69	1	
70 to 74	11	Average 46 (40%)
75 to 79	34	
80 to 84	26	
85 to 89	17	Good 43 (38%)
90 to 94	13	
95 to 99	6	
100 to 104	1	
105 to 109	2	Excellent 25 (22%)
110 to 114	1	
115 to 120	1	
120 and over	1	

TABLE 3 *Results of step test administe ed to 3 174 candidate student p lots*

St p-test index	Number	Total according to H rva d nom nclature (per cent)
60 to 64	50	Weak 2
65 to 69	213	
70 to 74	462	Average 44
75 to 79	726	
80 to 84	618	
85 to 89	447	Good 34
90 to 94	317	
95 to 99	153	
100 to 104	96	
105 to 109	39	
110 to 114	26	
115 to 119	7	
120 to 124	4	Excellent 21
125 to 129	4	
130 to 134	3	
135 to 139	3	
140 to 144	4	
145 to 149	0	
150 to 160	2	

and university students students of technical schools young officers noncommissioned officers and military personnel of the Army or ground personnel of the Air Force

The analysis of this particular distribution shows that (1) the index was below 75 in 23 per cent of the candidates compared with 10 per cent for student pilots and fighter pilots and (2) the index was below 70 in 8 per cent of the total number of candidates

Not all of these 3 174 candidates were declared physically fit For administrative reasons 451 candidates were not admitted to training Of those who were allowed to enter pilot training many were not successful for various reasons Lack of flying proficiency disqualified the greatest number 1 061 candidates 852 others were dropped because of physical unfitness upon the initial medical examination 103 were killed 60 were dropped because of medical reasons (such as airsickness sequelae of accidents and illness during training 21 were dropped at the time of the step test and 43 were dropped for disciplinary reasons Of the original 3 174 candidates 583 became jet pilots

Leg Length and Height Weight Ratio

Before making any interpretation of the statistical data it seemed necessary to make sure that the step test index is not influenced by body build

Subjects for this study were pilot candidates between 1 62 m and 1 95 m in height and between 55 kg and 90 kg in weight The measurement of the length of their legs was a functional one The technic described by the Royal Air Force manual *The Medical Examination for Fitness for Flying* was used The subject is seated against a wall legs outstretched Length of the legs is the distance between the wall and the soles of the feet All candidates should have legs equal to or longer than 100 cm

The study was carried out on 1 672 subjects with regard to the height weight ratio and on 1 663 subjects of the same group with respect to leg length (nine records failed to present an exact measurement)

Statistical calculations demonstrated that the height weight ratio and leg length have no significant influence on the results of the step test within the limits described here Because of the lack of a sufficient number of subjects it was not possible to collect data on subjects having legs shorter than 100 cm

CLINICAL AND PSYCHOLOGIC DATA

Before stating positively that the step test should be included in the routine medical examination for flying fitness it seems

logical to make certain that the step test involves no risk for a normal subject, candidate pilot or student pilot, because of the intensity of effort required to perform it

Effort Required During the Step Test

The step test is a severe test In the large majority of cases, however, the test did not seem to require any effort which could overtax a young and healthy subject In 21 pilot candidates (0 6 per cent) in mediocre physical condition, eliminated at the time of their initial medical examination, it was deemed advisable to stop the test after three minutes because of the sudden appearance of objective manifestations of exhaustion The test is performed easily during the first three minutes even by subjects in poor physical condition When, during the last two minutes the test becomes too exhausting, the first sign of exhaustion is the subject's difficulty in following the rhythm set by the metronome

Cureton and associates[11] carried out measurements of different respiratory, circulatory and metabolic factors on American Olympic champions while they were performing several types of exercises and during the rest period afterward Their results showed that the five minute step test gave results almost identical to those obtained during a run on a treadmill, on a horizontal plane at a speed of 10 miles per hour for 3 minutes 57 seconds The distance run at this speed corresponded to 1 073 meters in 3 minutes 57 seconds In confirmation of these data, athletic tests administered to pilot candidates of the Belgian Air Force had shown us that classifications according to the step test index generally agreed with results obtained in a race of 1 500 meters in 5 minutes 45 seconds The effort expended in the five minutes of this test thus does not exceed that which might be expected of a subject in good health

Cardiac rate Cardiac rate gives an indirect means of evaluating the effort required by the step test The rate recorded at the beginning of the second minute after completion of the five minute step test that is to say, after one minute of rest is compiled in table 4 for a group of 543 of our subjects The heart rate is also shown in these same subjects after one minute of rest on completion of a three minute step test

Slonim Gillespie and Harold[12] reported on results of exhaustion tests given in 1956 to 50 subjects, aged 18 to 25 years, candidates for naval aviation training in the United States Navy The technic used was a run at a speed of 3 5 miles an hour on a treadmill at an incline varying from 10 to 28 per cent The mean and extreme rates per minute were noted as follo

	After ½ min	After 5 min	After 6 min
Mean rate/minute	18[illegible] +7 [illegible]	186 7 7	188 +7 9
Extremes of rate	168 198	1[illegible]0 ?01	174 204

During the tests a syncope occurred in one of their subjects after 5 minutes 40 seconds his rate was 196 at the fifth minute ventricular extrasystoles were noted during exercise in three of their subjects who e cardiac rates were between 184 and 190

As shown in table 4 the most rapid cardiac rates noted in our subjects evaluated by the step test, after one minute of rest were still far from those around 190 which caused collapse and exhaustion according to the observations of Slonim and his colleagues [illegible] If it is estimated that 10 beats are the mean de

TABLE 4 C d t 543 ubj ct ft com l t f t p t t

Card a t pe min t	Numbe of s bj ts	
	5-m n t t p t st	3 m t t p t t
67 0	2	9
2 80	0	30
81 90	13	46
91 100	20	73
101 110	61	101
111 120	132	134
121 130	135	91
131 140	102	43
141 150	58	13
151 160	17	3
161 170	3	

celeration occurring during the first minute of rest it can be shown that the rate in almost all subjects would not exceed 170 at the end of the step test Under the same conditions the rate would not exceed 160 a minute in 96 per cent of the subjects This gives us additional support for deciding that for a young subject in good health the step test in spite of its severity does not come near the limits which might cause acute and serious exhaustion Finally aside from the 91 young men eli minated for medical rea ons step tests in the remaining 3 308 ubjects were carried out without mishap or incident

Electrocardiographic tracings Electrocardiographic tracin s have been recorded on 100 subjects under the following con ditions (a) with subject lying down before the step test (b) 1 minute after the test (c) 2 minutes after the test (d) 3 minutes

after the test and (e) 10 minutes after the test The three standard limb leads and the sixth precordial lead were recorded Standard leads I and III were taken each time for a period of 30 seconds, standard lead II and the sixth precordial lead were taken for 10 consecutive seconds The results are as follows All tracings showed characteristics of the electrocardiogram recorded after exercise (a) lowering of the amplitude of P_1 (b) increase in that of P_2 and P_3, in some cases a lowering of the amplitude of P_2 or *status quo* (c) reduction in amplitude of T_1 (d) increase in amplitude of T_2 (e) eventual straightening out of T_3 negative and (f) reduction in duration of auriculoventricular conduction time and of intraventricular conduction and reduction of Q T duration Ten minutes after the end of the test these reductions still remained in varying proportions according to the subjects

Very often, a downward curving of the S T segment especially in lead II and lead III, was found This curving sometimes lasted during four to six contractions, disappeared then returned in similar short episodes during the following minutes A few anomalies were revealed in this group of 100 electrocardiograms

1 In one subject, auricular extrasystoles appeared after effort Duration of the QRS complex increased after the step test and still remained elongated with respect to the amount of rest 10 minutes after the end of the test There were seen, respectively values of 0 075 seconds at rest for a rate of 50 0 09 seconds after 1 minute for a rate of 76 and 0 085 seconds after 10 minutes for a rate of 64

2 In another subject, ventricular extrasystoles appeared during the third and fourth minute after exercise The QPS complex was not modified

3 In another subject who, at rest presented fluctuations of the automatic center or Wenckebach periods these episodes disappeared after the step test and did not reappear ten minutes after the step test So is demonstrated the benign meaning of the phenomenon

4 In one subject the appearance of a nodal rhythm was seen which was maintained from the second to the fourth minute after the step test, then disappeared

5 In four subjects during the first four minutes after the step test a lengthening of the QRS was seen for a few episodes of five to six contractions Duration of the QRS, however never exceeded 0 12 seconds In the tracing taken at the tenth minute this lengthening no longer existed In any event, if one agrees with Schellong [3] that shortening of the QRS complex after exertion is an accurate test of the integrity of the myocardium and, that

the first sign of fatigue of the cardiac muscle is precisely the elongation of intraventricular conduction time after effort one is justified in stating that the step test induced this sign of cardiac suffering only five times out of 100 cases In addition it was noted that one subject who while resting showed signs of myocardial disturbance of rheumatic origin perfectly with stood the test without any other symptom of cardiac change having been manifested by the test Such results objectively controlled by the electrocardiogram confirm the innocuousness of the test in a young subject in normal physiologic condition the few anomalies shown being only functional and transitory

Next the direction of the mean electrical axis of QRS before the test and during the 10 minutes following the step test was analyzed Segers and his associates reported that in the morphology of the electrical complexes the most striking peculiarity revealed in all the long distance runners whom they examined was a much more marked deviation of the electrical axis toward the right than that in the average tracings taken on normal sedentary subjects

In the 100 tracings reported here the direction of the electrical axis during rest before the step test then during the 10 minutes after the test was observed Table 5 shows data relative to the direction of the electrical axis on 100 subjects at rest It is seen than 50 per cent of the subjects at rest had a mean electrical axis of QRS with a direction beyond plus 70 degrees

Immediately following the step test a rotation of the axis toward the right by 10 degrees or more in 84 cases and absence of axis rotation in 16 cases were found For the 84 cases maximum rotation was found (1) on the tracing taken after one minute in 58 cases (69 per cent) (2) on the tracing taken after two minutes in 19 (?2 6 per cent) and (3) on the tracing taken after three minutes in 7 (8 4 per cent)

Return toward the condition of that during rest was done in a progressive manner minute by minute but was not completed after 10 minutes in most cases A tracing taken in hyperpnea at rest before the test in 40 cases showed that hyperpnea causes either a lack of rotation or a rightward rotation of varying degree but the rotation consecutive to the step test was clearly more marked than that during hyperpnea at rest

Comparison of the degree and direction of axis rotation after the step test with the score of the step test index anomalies of the tracings and the athletic habits of those concerned led us to the following conclusions

1 A maximal deviation to the right existing at the very beginning of the second minute after the end of the step test and re

turning progressively toward the direction found during rest was encountered in trained athletes and in subjects having a high index of cardiac tolerance to physical exertion All of the subjects in this category had a step test index above 78

2 A rotation to the right where the maximum is reached only at the third minute after the end of the step test coincides in 50 per cent of the cases with low indices (average, weak, mediocre or doubtful) and almost always in subjects who declared that they participated in no sport

3 A rotation toward the right where the maximum deviation was attained only during the fourth minute after the end of the step test was seen in six cases This occurred in three subjects with an index of mediocre value in one subject with an elonga

TABLE 5 *Direction of electrical axis for 100 subjects*

Direction of electrical axis (in degrees)	Number of subjects
10 to 0	2
0 to 29	4
30 to 39	7
40 to 49	4
50 to 59	15
60 to 69	18
70 to 79	20
80 to 89	16
90 to 99	11
100 to 109	0
110 to 119	3

tion of QRS and in one subject with the appearance of nodal rhythm between the second and fourth minute of the step test It seems therefore that this maximum slow rotation could be a sign of difficulty in cardiac adaptation to intense physical exertion or of a pathologic condition

4 Absence of rotation toward the right after the test occurred in subjects who were clinically in good condition but who said they practiced no sport and whose athletic activity was at a minimum

5 A rotation toward the right where the maximum deviation was shown at the very beginning of the second minute after the step test but where the axis did not return to the left during the next ten minutes, was found in trained athletes (cross country runners) In this case, it was accompanied by a good step test index In cases where this axis location was accompanied by an index denoting mediocre or doubtful tolerance to exertion,

subjects stated that they participated neither in a sport nor in physical training Thus it appears that whatever the explanations which may be given to these statements the nature of the modifications which supervened in the direction of the axis during the period of recuperation after the test constitutes an important factor for the evaluation of cardiac aptitude to exertion and that that element should be taken into account as well as the score of the step test index

Motivation

The test requires an effort of increasing will mainly beginning with the third minute Thus it is absolutely necessary that the test be carried out under psychological conditions of an elimination test that is to say the subject should be sufficiently motivated to continue his effort The test is to be performed only by subjects such as pilot candidates or pilots who are scheduled for medical checkup, where the test result is important in the admission to or continuation of a career in athletics or aviation for example

DISCUSSION

On the basis of statistical data the object of this study was to determine whether or not the step test should be included as part of the medical examination for flying Use of the step test could be justified only if it were shown that this test sets the minimum level of endurance and cardiovascular adaptation to the many factors or conditions imposed in flying These would include hypoxia rapid acceleration in flight variations in temperature necessity to bail out and stresses imposed by operational fatigue In this case it is important to set a score below which elimination of the candidate would be required because of the risks of failure involved

Use of the step test could be justified also if it were proved that cardiac tolerance to physical exertion shown by the step test index is related to successful instruction and training of the student pilot

Does the step test allow us to set a minimum level of cardiac tolerance to flying stress that should be required of the candidate pilot? In this respect it seems logical to demand of the candidate at the very beginning of his career an endurance reserve that is sufficient for the performance of his duties and that can be maintained at a normal level According to the studies of Cureton and associates [4] on American Olympic athletes in 1948 the step test index was high in the case of all athletes in competition where endurance was needed such as swimmers of 200 meter 400 meter and 1 500 meter races and long and medium distance runners Studies by the same author showed that among

28 athletic sports, the mile run was the one that gave the best individual measure of endurance (r = 0 708), and possessed the highest value for prediction of form (r =0 924)

Cureton and associates[11] found a statistical correlation of 0 54 after preliminary training in the step test and in the mile run The step test corresponds most nearly to the 1,500 meter run for the physiologic factors involved and is justified, therefore, as a measurement of a pilot s endurance

In this study statistical data relative to jet pilots and student pilots established that the step test index of 70 is the lowest possible limit of cardiac tolerance for exertion for jet pilot training, according to the criterion of a satisfactory physiologic condition

First of all, it was proved that subjects having an index below 70 comprised more than 16 per cent of the group of candidates eliminated at the time of the initial examination for reasons of a clinical nature other than a deficiency of vision or hearing, and more than 13 per cent of the category of subjects declared fit at the time of that examination but eliminated later, during their training, for medical reasons Such figures indicate the care the examining physician must exercise in physical examinations of those subjects having such a low step test index as, in at least one case out of six there will be evident symptoms of a poor physiologic condition incompatible with flight training

Among the 140 subjects whose index fell below 70, and who were eliminated at the initial medical examination for a reason other than that of a deficiency of vision or hearing we found most often, sequelae of pleurisy, pulmonary tuberculosis neurasthenia moderate hyperthyroidism functional or organic diseases of the heart and vascular system, diseases of the kidneys very marked insufficiency in strength All these subjects, in spite of their physical unfitness had been given the step test for experimental purposes

By statistical calculation an attempt was made to determine to what extent an index below 70 is linked to the increase in the number of eliminations during training and to the number of fatal flying accidents According to the chi square method that was used the following conclusions were reached (1) The initial medical examination eliminates a percentage of candidates with a step test index below 70 that is significantly higher than the general proportion of the whole group (2) Among the group of 1 850 candidates admitted to training, the category that later gave evidence of a physical deficiency that can lead either to elimination or that can explain some fatal flying accidents has a significantly greater number of trainees with an index below 70 than the group as a whole

Lowering the limit of the step test index below 70 results in a significant increase in the number of students killed during training and a significant increase of eliminations for medical reasons during training

Among the 122 students who had an index below 70 however and who were admitted to flying training 32 (26%) went on to become successful pilots The question then arises as to whether these 32 pilots might not still have a certain handicap despite the fact that they barely passed the different elimination tests For 19 of them we have the results of a step test given three to four months after their admission to the elementary flying training school Eighteen subjects reached an index above 70 and one subject an index of 69 at that time It is apparent that some young subjects in doubtful physical condition at the time of the initial medical examination but who are clinically fit can improve their physical condition in a few months at the elementary flying training school

The following practical conclusions were drawn from the statistical data

1 Subjects with a step test index below 70 should be screened very carefully by medical examiners at the time of their initial physical examination Those who after a thorough medical examination, show no illness or deficiency or sequelae of an illness indicating unfitness on a clinical basis still have a reasonable chance of becoming pilots because of the possibility of appreciable improvement of this physiologic condition in the training period These are a category of doubtful" cases Consequently these candidates should be considered as temporarily unfit or kept under very close medical supervision until they attain the step test index of 70 after appropriate physical training

2 Subjects with an index of 64 or below no longer meet the conditions for fitness and adaptation to intense strain sufficiently They should be eliminated at once for their chances of becoming physically fit are too uncertain

For the specific purpose of the medical examination for flying fitness seven categories of cardiovascular tolerance to strain connected with flying have been established category one being that of excellent subjects The details are given in table 6

Does the step test have any relation to success in pilot training? A minimum level of cardiovascular tolerance to strain linked with flying has been set in order to assess flying fitness Does a higher degree of cardiovascular tolerance have a favorable bearing on the psychomotor aptitudes necessary for success in pilot training? In other words is the champion athlete more

likely to complete the flying school course successfully than the applicant with a normal or merely sufficient degree of endurance? Graybiel and West,[15] in experiments with 1,076 U S Navy pilots undergoing flight training, found that within the limits of physical fitness in the group under study, differences

TABLE 6 *Categories of cardiovascular tolerance to strain for fitness for flying*

Categories	Cardiovascular tolerance	Step-test index
1	Excellent	90 and over
2	Good	80 89
3	Average good	75 79
4	Average weak	72 74
5	Mediocre	70 71
6	Doubtful	65 69
7	Insufficient	64 and below

in degree of physical aptitude, measured specifically by the step test, the pack test and by other physical tests have no relationship to success in flying Of 1 000 students finishing primary training 10 (1 per cent) had step test scores between 60 and 69 These authors although not setting the exact limit of minimum cardiac tolerance did conclude that "from the results it is apparently unnecessary to maintain superior levels of physical fitness during the training stages "

If our classification of seven categories (table 6) is used for the 583 subjects who graduated and for the 1 061 eliminated during training because of professional deficiency it is obvious that the chances of success are not greater for subjects having a high degree of cardiac tolerance The percentages for fit and unfit student pilots in each category are extremely close (table 7)

The findings thus confirm those of Graybiel and West[15] and establish that (1) Above a certain minimum threshold of physiologic condition at an index value of 65 success or failure in flying training cannot be predicted from the degree of cardiac tolerance to strenuous physical exertion in which this tolerance alone can be measured (2) It is not necessary to seek very high levels of physical endurance during training of the pilots However the minimum physiologic condition required at the beginning of the jet pilot candidate s career should correspond at least to an index of 70

Use and value of the step test during flight training in the routine medical examination By using the step test at fixed intervals it is possible to control the effect of a military train

ing program on the physiologic level while pilots are at the flying training school or are serving in squadrons A group of 166 student pilots took the step test at the time of their select ion examination and after a stay of six months at the flying training school The results are shown in table 8 It is easy to understand the value of the information so collected by the medi cal service for a periodic check of the physiologic condition of the flyers

TABLE 7 *F t d ft t d tp l t h t g ry f d t l c*

Cat g	F t		U f t b c f p f on l d f cy	
	Numbe	P t	Numb	P t
1	123	21 1	225	21 1
2	189	32 4	353	33 2
3	150	25 7	248	23 2
4	68	11 6	125	11 7
5	21	3 6	42	3 9
6	32	5 4	63	5 9
7		0	5	0 16

TABLE 8 *Ch g rr g th t p t t d ft x m th f 166 t d tp l t*

C t gor	Impr d t g ry ft m h	S m g ry f mon h	L w t gory ft m th
1		14	12
2	16	22	9
3	23	14	10
4	13	5	2
5	5		2
6	16	1	
7	2		

The step test was not given pilots aged 98 years or more In the routine medical examination less exhausting and strenuous tests are more appropriate to check the physical condition of jet pilots in operational squadrons

CONCLUSIONS

Conclusions drawn from the study of the statistical and clini cal data on the use of the step test in the assessment of air crew fitne are as follows

1 The use of the step test is justified as an elimination test at the initial medical examination of a candidate pilot The test sets the minimum threshold of cardiac tolerance required of candidate military pilots at that time

An index value of 70 provides a sufficient guarantee as to the degree of cardiac tolerance in subjects previously considered qualified by other clinical tests in the medical examination for flying fitness

A higher proportion of fatal accidents and a higher proportion of eliminations for medical reasons during training occurred in subjects whose index fell between 65 and 69

An index below 65 should lead to immediate elimination An index between 65 and 69 should lead at least to temporary unfitness until the subject can reach a score of 70 or more

The ECG tracings recorded immediately after the step test only rarely show some slight signs of cardiac insufficiency These are transitory ones Rotation of the mean QRS axis during the test is one of the factors to be considered in the assessment of cardiac tolerance

2 The step test is not justified as a classification test The step test index has no relationship to the specific aptitudes for flying, that is it has no value in predicting success or failure in pilot training

3 The step test enables the medical examiner to follow variations in cardiac tolerance to physical exertion during various phases of flight training

SUMMARY

The step test was given to 3 329 young Belgians Study of the statistical and clinical results show that the test is justified as an elimination test at the initial medical examination The step test is not justified as a classification test for predicting success or failure in flight training

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REFERENCES

1 E ard E L l d p p rt d phy q d l d tr d l m d o-phy l q d d d t ur l F A nn B lg *L med. Aero* 4 291 307 Ap 1951

2 Evrard E E d ppl t d p- t tr l med o- port f l l d ur *T av ux d l S cr t M d l B lg d'Educ t on Phy que t de Spo t* 5 55 75 1950 1951

3 Evrard E Appl d p-t t l l tr l méd l p od q d ur *L med. Aero* 8 375 393 Aug 1952

4 E d E N mpl m us l ppl d p- t l l d ur t l l d l ur d g d f m phy q *An B lg d m d. Aero M l t* 1 2 J n. 1952

5 B uha L G yb l A. d H h C W S p mpl m hod f m urng phy l f f hard m lar w k d l m *Rev anad. d b l* 2 86-91 F b 1943

6 D ll D B and B uh L E d ur l ythm ard q p d l er R pp l g l tr m *T av humam* 5 1 18 1937

7 J h R E B uh L d Darl g R. C T f phy cal f f rt *Rev anad d b l* 1 491 503 Jun 1942

8 M lm j J D g D d V P Sur q lq l an l p-t (d l l) Ep d p ud phy q d q l ff t L *med Aero* 3 45 51 M h 1948

9 G dp R N ur un t d p t d d q l ff rt l p-t *L med. Aer* 2 353 357 Jun 1947

10 Th M d l E mın f F tn f Fly g Het M j ty S t ty L d E g 1940 p 16

11 Cur T K J d h *Phy l F t f Champ on Athl t* U Ill U b Ill 1951 pp 255 266 351 364

12 Sl m N B G ll p D G d H ld W H P k xyg p k f tr d h lthy y g m d m d by dmill m th d P j ct NM 14 01 11 S b k 4 R p N l U S N l S hool f A M d P l Fl 1956

13 S h ll g F *R gul t nspruſung d K lauf* S nk plf D d L p g E G 1938 pp 57 63

14 S g M. K g M H d k J d B yadg N A aly d l ctro- d g mm d 205 ur ur p d *T avaux d la S cı B lg d'Educat on Phy qu d Spo t* 9 3-14 1955 1956

15 G yb l A. nd W t H R l h p b w phy l f t and g f U S N l fl gh ud t *J Aviatio M d.* 16 242 249 Aug 1945

CHAIN REACTION OF SERENDIPITY

An 18-ye old Scottish chemist n med William Henry P rk w try g to synthes ze qui ne from coal ta more th a ntury ago whe wh le w sh ng the black m fr m hi t st tube he w s alert e ough to dete m ne th t ther w s hist ry s fi st important artif l dye That f nd led to a ch n r act on of se end pity th dye s acc dent l us essenti l ta n fo b cte iolog al study the unplanned birth of o g c hem try and th surprise devel pment f a w de var ety f medic n l compound in luding t br ne pir nd th sulfo am des The or gin l ulf n mide h d l n dl on se rch shelves f years because t wa co s d d only a dy ba e —Milton Golin S rend pity—Big W rd Med l P g e s *The Neu Phy cia* Novemb r 1958

AN EXPERIMENTAL STUDY OF "PHYSICAL FITNESS" OF AIR FORCE PERSONNEL

BRUNO BALKE M D
RAY W WARE *Captain USAF (MC)*

MODERN highly civilized life has almost completely removed the necessity for greater physical effort. Automation in labor, in transportation, and in many activities of daily living has greatly reduced the need for previously required physical exercise As a consequence, the great functional reserves of the human organism, provided by nature, may become seriously affected since the organs are readily adaptable to changes of functional demands Regular physical activity enlarges metabolic, circulatory, and respiratory reserves while inactivity has the opposite effect Although high functional reserves have never been found to be undesirable, the sedentary man insists that he can easily live without them It is not known, however, to what extent the reserves may diminish through the years without ill effect on the man's well being, and not much is known about the normal range of capacity for coping with increased metabolic demands No standards of physical fitness" are established yet because fitness" has never been clearly defined and, therefore, is not measurable

It is generally understood that a high level of physical fitness" enables a person to meet strenuous physical demands with the least strain of functional effort and with fewer consequences of physical fatigue Inasmuch as the physiologic reactions to work are measurable and a determination of the functional limitations is possible with a sufficient degree of accuracy, an appraisal of the physical performance capacity of an individual appears to be feasible Work capacity could be defined as the highest level of metabolic load which can be compensated for adequately by optimal co ordination of the functional reserves This definition of work capacity is based on the experimental evidence that in gradually increased work a point will eventually be reached at which definite physiologic limitations result in a failure to adequately meet further metabolic requirements These functional limitations may be of a cardiovascular, respiratory, metabolic or hormonal nature

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The most objective criterion of work capacity as defined is the maximal oxygen consumption as a measure of circulatory and respiratory adaptability On the basis of this criterion Åstrand determined the work capacity of a large group of persons and correlated the results with sex and age His experimental group was composed mainly of Swedish physical education students and the results of the study reflect accordingly a relatively high level of performance capacity In a clinical study Luft determined the physical competence of male outpatients 20 to 45 years of age All were in good health according to rigorous clinical standards but not accustomed to occupational or recre ational physical exercise The results therefore reflect a rel atively low level of work capacity

To fill an existing gap in knowledge and to obtain more in formation about the normal range of man s physical performance capacity a study was initiated to screen the work capacity of a large population This report presents the experimental results of the first series of investigation of about 500 male military and civilian Air Force personnel

METHOD

The method of screening work capacity developed in this labor atory has proved a useful tool in evaluating changes in work capacity brought about by changes in physiologic or environ mental situations The test on the treadmill or ergometer bi cycle begins with light work requiring an energy expenditure of not more than four times the resting rate That is accomplished on the treadmill by walking at a speed of 90 meters per minute (or at 3 3 m p h) on a horizontal level Every minute a light load is added by elevating the treadmill angle 1 per cent The increase of work intensity is so gradual that functional adapta tions take place within a few seconds Thus there is hardly any difference between the functional values measured during any given minute of this test and the values measured during steady state work at comparable gradients

The adaptive functional response to the gradually increased metabolic requirements is assessed by cardiovascular and respi ratory measurements Previous studies have shown that attain ment of a pulse rate of 180 beats per minute may serve as the critical cutoff point of this test Although maximal work capacity usually reaches well beyond this point there are sufficient physiologic indications to validate this criterion as a useful measure of the aerobic crest load A continuation of work beyond this point is in most instances not paralleled by further ade quate functional adaptation Work then becomes increasingly anaerobic

The maximal oxygen intake measured at the cutoff point of this testing procedure is generally somewhat lower than the values determined by the usual procedure wherein work of six

minutes' duration at a constant maximal load is used However, it might more closely represent the maximal oxygen intake which can be maintained for longer periods of time and, therefore, may express more appropriately the capacity for sustained work

In a relatively small number of cases the test cannot be carried on to a pulse rate of 180 beats per minute Occasionally, obvious respiratory limitations or a nonreversible reduction of the blood pressure amplitude occur at lower pulse frequencies and serve as indications to terminate the test In men of advanced age the maximal pulse frequency rarely reaches 180 beats per minute [6, 7]

PROCEDURE

After arrival at the laboratory the experimental subjects were accustomed to walking on the treadmill until their stride became normal and relaxed They answered a short questionnaire as to age, rank present job, previous and present physical activities, smoking habits, and whether or not they favored a regular physical training program Weight and height were measured and the subjects were then readied for the test

Pulse rate and blood pressure measurements were taken before and after the test at sitting rest, and while walking on the treadmill during the second half of each minute Determinations of the respiratory gas exchange during work were made at regular intervals The work intensity was gradually increased by elevating the treadmill angle 1 per cent each minute

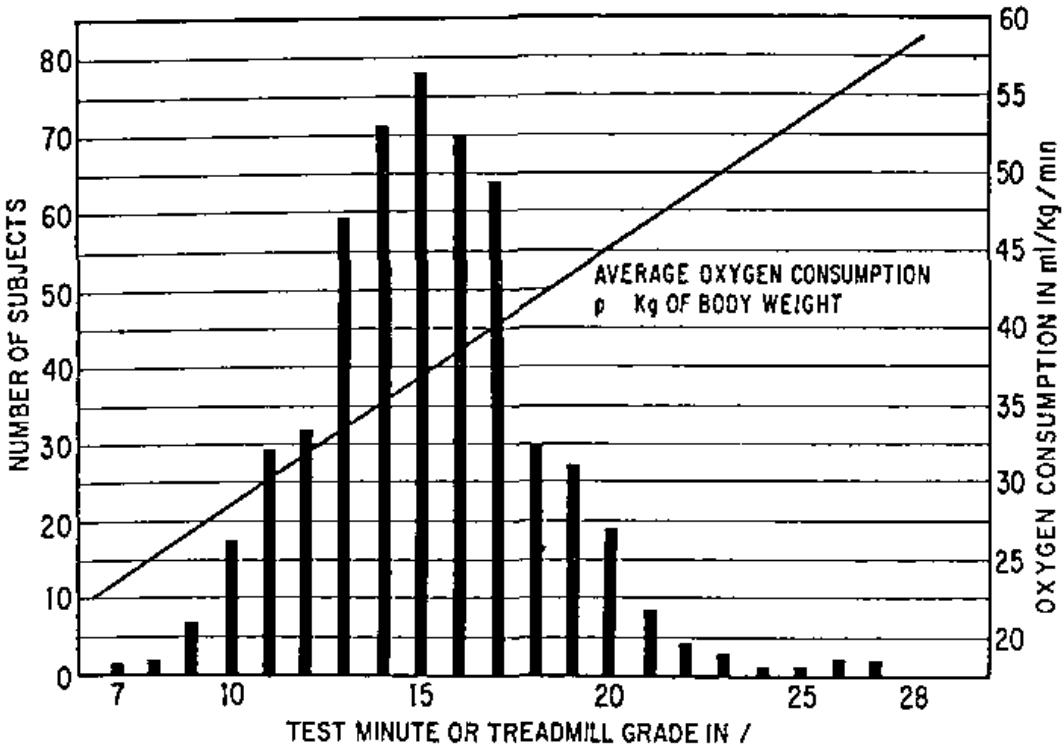
RESULTS

For quick orientation, the test duration in minutes, identical with the final treadmill grade in per cent can serve as a readily available criterion of work capacity On the basis of this criterion the test results from about 500 subjects were plotted As shown in figure 1 persons in the poorest physical condition attained a critical pulse rate of 180 beats per minute as early as the seventh or eighth test minute the average performance centering around the fifteenth and sixteenth minute and some persons, in excellent physical condition were able to last longer than 23 minutes before reaching the cutoff point Exceedingly well trained athletes (members of the U S Pentathlon Team) set the highest marks with 27 and 28 minutes

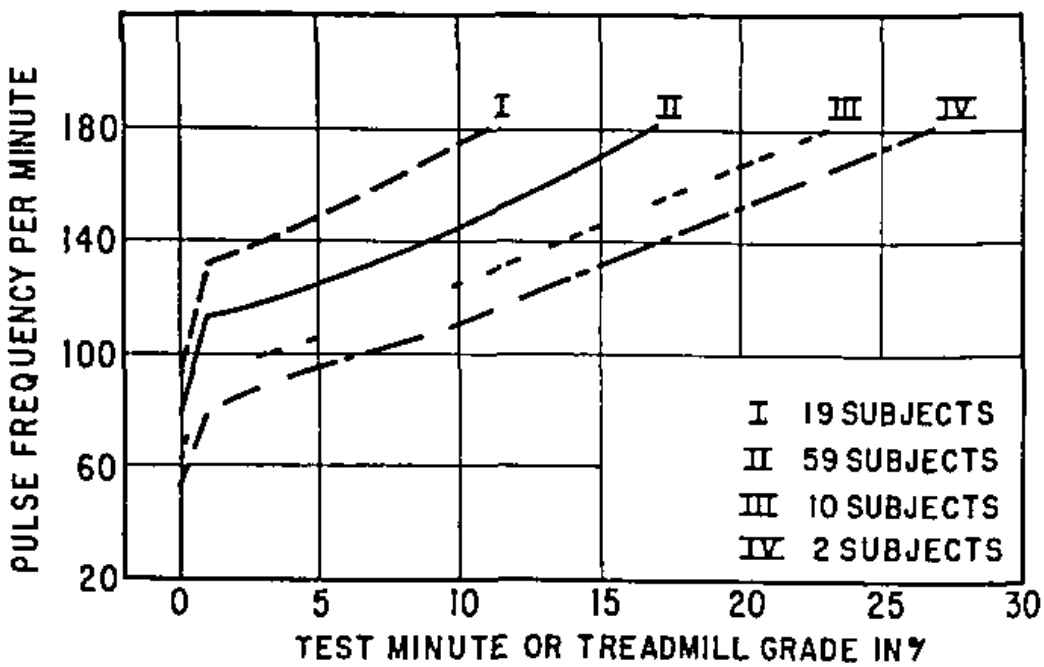
Using the measurements of the gas exchange during the test work, the average metabolic requirements for the gradually increased work were superimposed on the graph as oxygen consumption per kilogram of body weight per minute in order to demonstrate the correlation between the test duration and the physiologic demands of the corresponding loads

Cardiovascular Response

Of all the physiologic functions measured, the pulse rate at any given workload reflected most closely the status of the work capacity of a person Figure 2 illustrates the pulse response

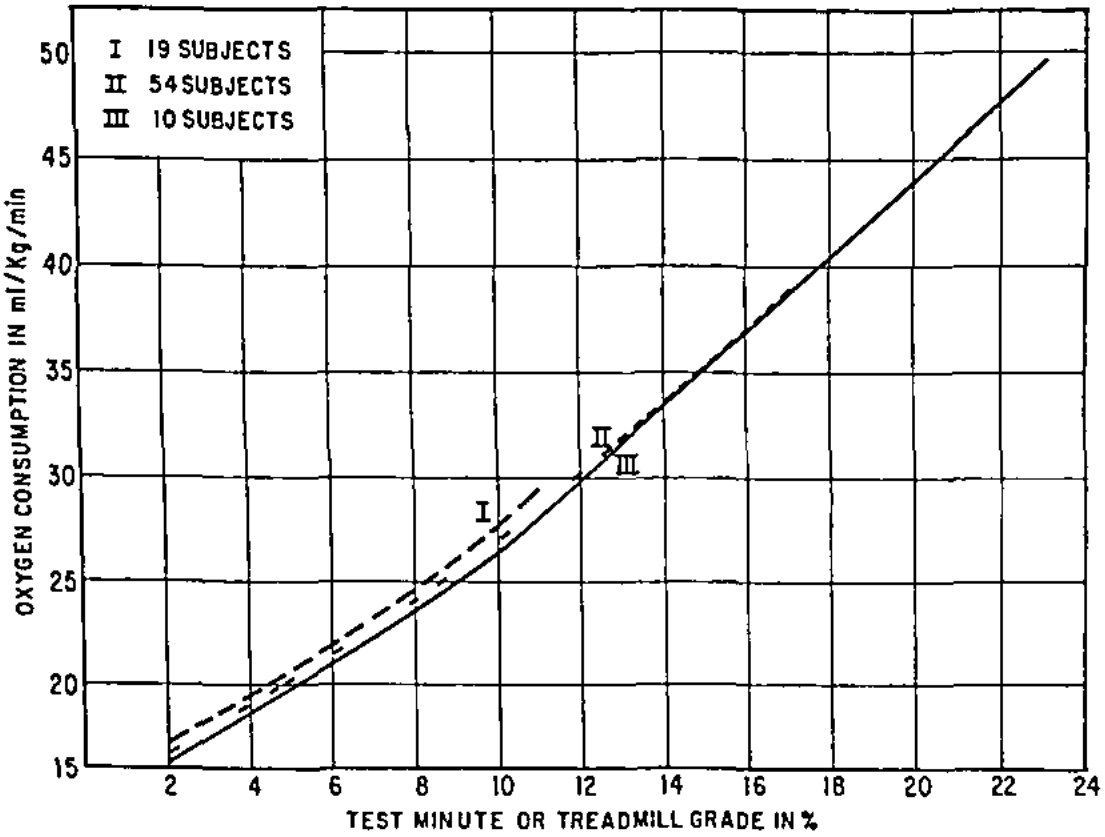


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patterns of four groups of persons the work capacity of group I was classified as "very poor," that of group II as "fair," that of group III as "very good," and that of group IV as "superior " There was a considerable overlapping of the individual values at the lower workload levels, hence, the use of any pulse rate below 180 beats per minute as a critical cutoff point for deter mining work capacity appears less reliable Most individuals not accustomed to strenuous physical effort display a variety of reaction patterns in their functional adaptation to gradually increasing work until they approach cardiovascular limitations



Figu e 3 Ave age oxygen cons mptio (per unit of body we ght) during the wo k capacity te t The work eff c ncy of the group in ve y poor condi on (I) appears to b only l ttle l s than that of the fair to good (II) or the ve y good g o p (III)

When blood pressure values, observed at the various work intensities, were averaged and plotted, certain trends became apparent the persons with lower work capacity had, on the aver age, higher systolic as well as higher diastolic pressures at comparable loads than persons with higher physical performance capacity The maximal systolic pressure, however, was for all groups almost identical Despite these apparent trends, the use of the blood pressure as a criterion for individual differentiation of work capacity is unsatisfactory because of the tremendous overlapping of the individual values The only statement that can be made with some degree of validity is that high diastolic pressures (100 mm Hg and above) usually designate low levels

of work capacity while very low diastolic pressures (from 60 mm Hg down to zero) are most likely to be observed in persons with high performance capacity

Oxygen Consumption

One might assume that a person s work efficiency (that is, the amount of oxygen consumed per unit of body mass at a given workload) would be of valuable assistance in determining work capacity Such a criterion however was found to be impractical Although group averages revealed a noticeable trend toward slightly decreased oxygen intake as performance capacity increased (fig 3) the overlap of individual values excludes the general use of this criterion in individual evaluation of work capacity In fact the real differences in the efficiency of walking are so small from man to man and the correlation between work intensity and oxygen requirement per unit of body mass is so well established that one is able to predict a person s total oxygen intake for a known work intensity The following linear equation proved to approximate very closely the average values of oxygen intake measured during the treadmill test

$$V_{O_2} = v \times w \times \left(0{,}73 + \frac{oc}{100} \right) \times 1{,}8$$

where

V_O the oxygen consumption in ml/min (STPD)

v = the treadmill speed in meters/min
w = the body weight in kilograms
oc the treadmill angle in per cent
1 8 = the factor constituting the oxygen requirement in ml/min for 1 meter kilogram of work

Considering the maximal oxygen consumption as the most satisfactory means of describing work capacity the oxygen intake at the crest load expressed in milliliters per kilogram per minute might be preferred as a functional criterion of physical performance capacity to either the time or the treadmill grade of the critical test minute In table 1 an attempt is made to correlate the results demonstrated in figures 1 and 3 with a suggested rating of physical working capacity The rating scale is based on the results from the test population on physiologic considerations and on observations of men at various stages of physical conditioning

Pulmonary Ventilation

While work efficiency estimated from the oxygen consumption proved an impractical criterion of work capacity the efficiency of breathing appeared more closely related to physical fitness Figure 4 clearly demonstrates that on the average the physically well conditioned person moves less air at comparable work intensities That means because the oxygen consumption is prac

TABLE 1 *Rating of work capacity in correlation with maximal oxygen intake or metabolic rate and with the test duration*

Rating of work capacity	Oxygen intake (ml/kg/min)	Oxygen intake of 75-kg man (ml/min)	Multiples of resting metabolic rate	Test duration (minutes)
inferior	25	1875	7	8
very poor	25 30	1875 2250	7 8	8 11
poor	30 35	2250 2625	8 9	12 14
fair	35 40	2625 3000	9 11	15 17
good	40 45	3000 3375	11 12	18 20
very good	45 50	3375 3750	12 14	21 23
ill	50 55	3750 4125	14 15	24 26
superior	55+	4125+	15+	27+

tically identical, that the extraction rate of oxygen from the inspired air is greater in the more physically fit man and, in turn, the fraction of carbon dioxide in the expired air also is greater

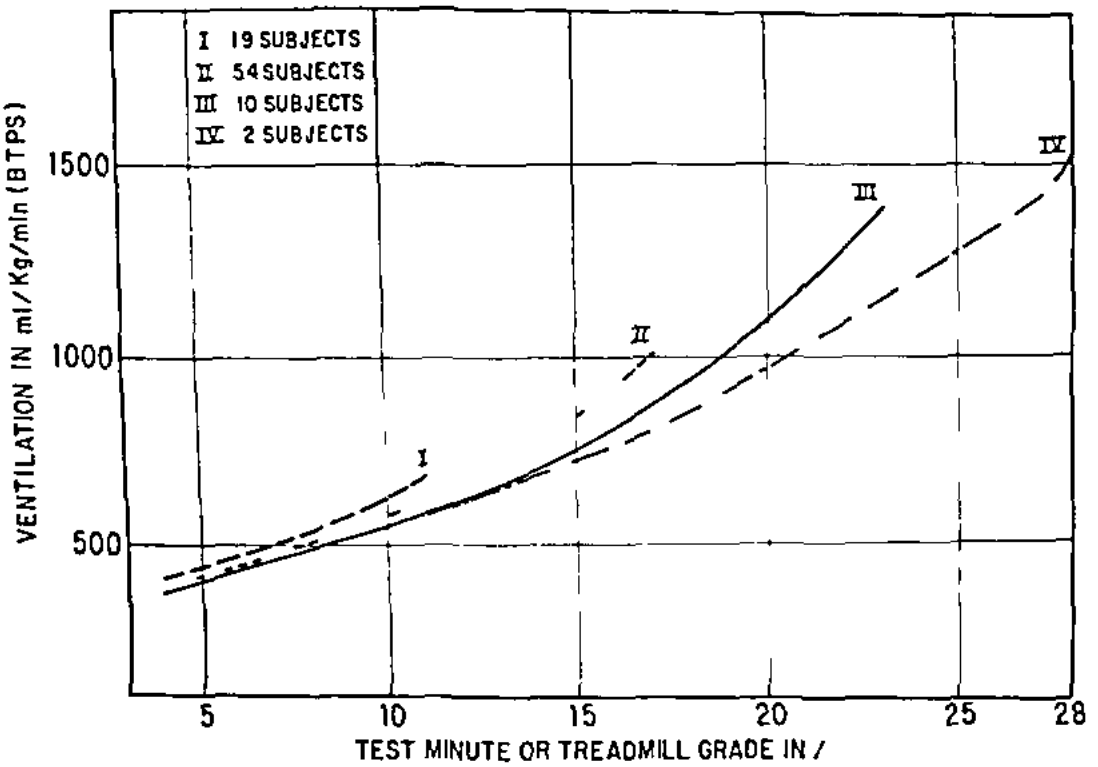
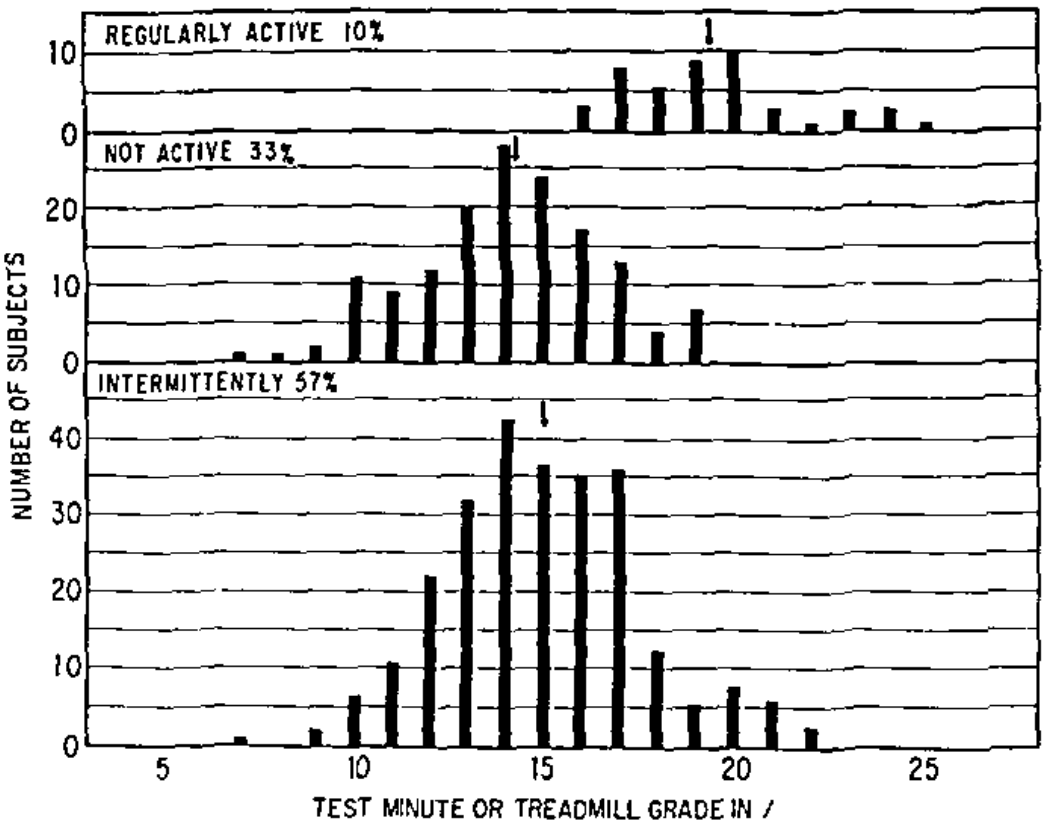


Figure 4 Pulmonary ventilation (per unit of body weight) serves as a somewhat better indication of work efficiency than the oxygen consumption. Greater work capacity is associated with a greater respiratory efficiency and usually with a greater maximal breathing capacity

In addition to such qualitative differences, the same figure demonstrates quantitative differences the maximal breathing capacity during work" attains higher values with progressing physical performance capacity

GENERAL OBSERVATIONS

Factors such as age activity weight and personal habits were shown to have some effect on the work capacity of the test population It is a common belief that aging leads to a progressive deterioration of physical working capacity Although the decrease of speed elasticity muscular strength oxygen debt capacity and of several other parameters of functional capabilities appear well established it is known that some older men can be surprisingly efficient in activities such as farming or other occupational outdoor work in hiking climbing skiing and even in sports as tennis fencing and others which require considerable skill



F g 5 D st b t f the nd vd l t st lt as lat d t phy lly t ve or t e l g hab ts. A ow d at g p ave g

The present experimental study has demonstrated that aerobic work capacity is not inevitably affected by age but is affected far more by living habits On the basis of replies of 455 persons to the question regarding physical activities 149 persons (33 per cent) had to be regarded as living a strictly sedentary life 260 (57 per cent) engaged intermittently in some sort of sports or outdoors work and only 46 (10 per cent) considered themselves as regularly active in any kind of physical exercise

Distribution of the individual test results (fig 5) reveals a poor average performance for the sedentary group a poor to fair

level of work capacity for the intermittently active group, and good functional reserves for the group with regular physical activity

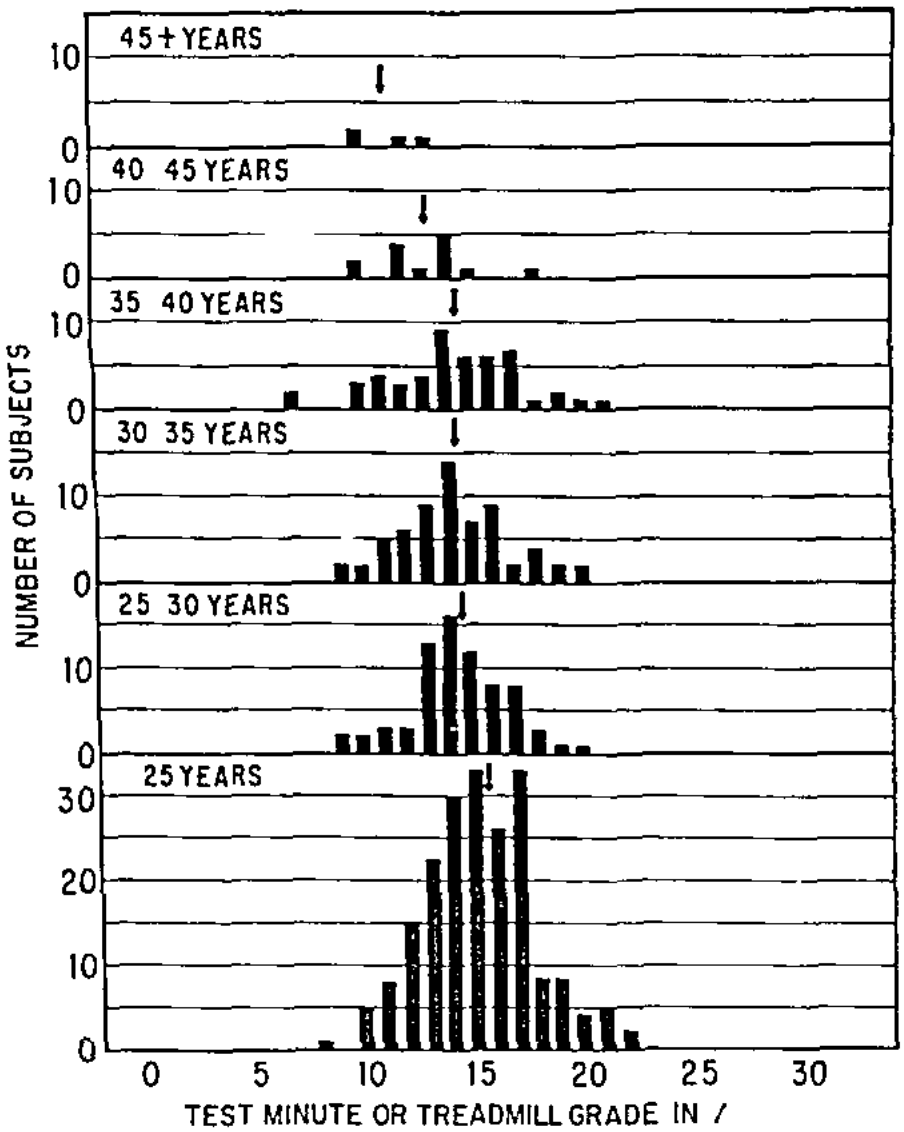


Figure 6 Distribution of work capacity of the test population with sedentary living habits according to various age groups

The results for the first two groups support the general opinion that work capacity is reduced as age advances (fig 6) but results for the group with regular physical activity demonstrate that a high level of capacity for aerobic work can be maintained as one grows older (fig 7) This latter group includes persons in the age range from 22 to 65 years, the average being 36 years

The effect of weight on performance capacity was evaluated by dividing the test population into groups of normal weight, underweight, and overweight individuals The following crude yardstick was used to make this differentiation the weight was considered as "normal" within 90 to 100 per cent of the total body length in centimeters minus 100 centimeters For example

a man who measured 182 cm in height (6 ft) was considered as having a normal weight within the range of 74 to 82 kg which is between 90 to 100 per cent of 82 (182 cm minus 100) Under weight or overweight was indicated when a man of the same height weighed less than 74 kg or more than 82 kg respectively

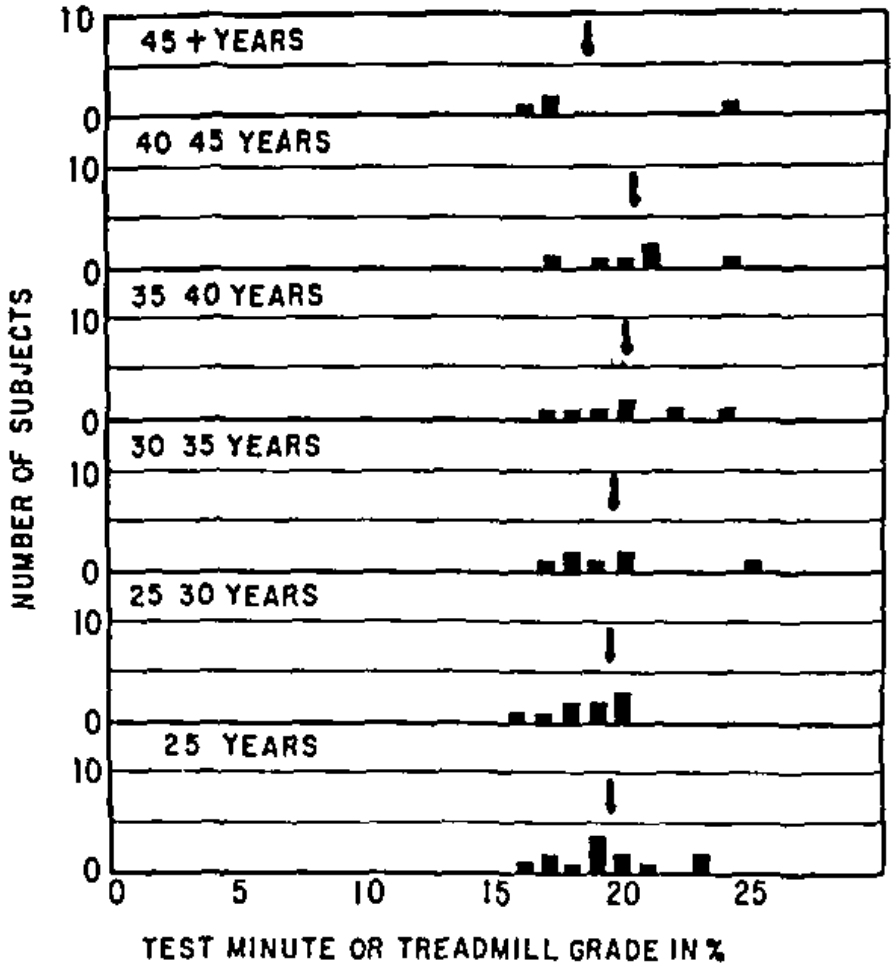


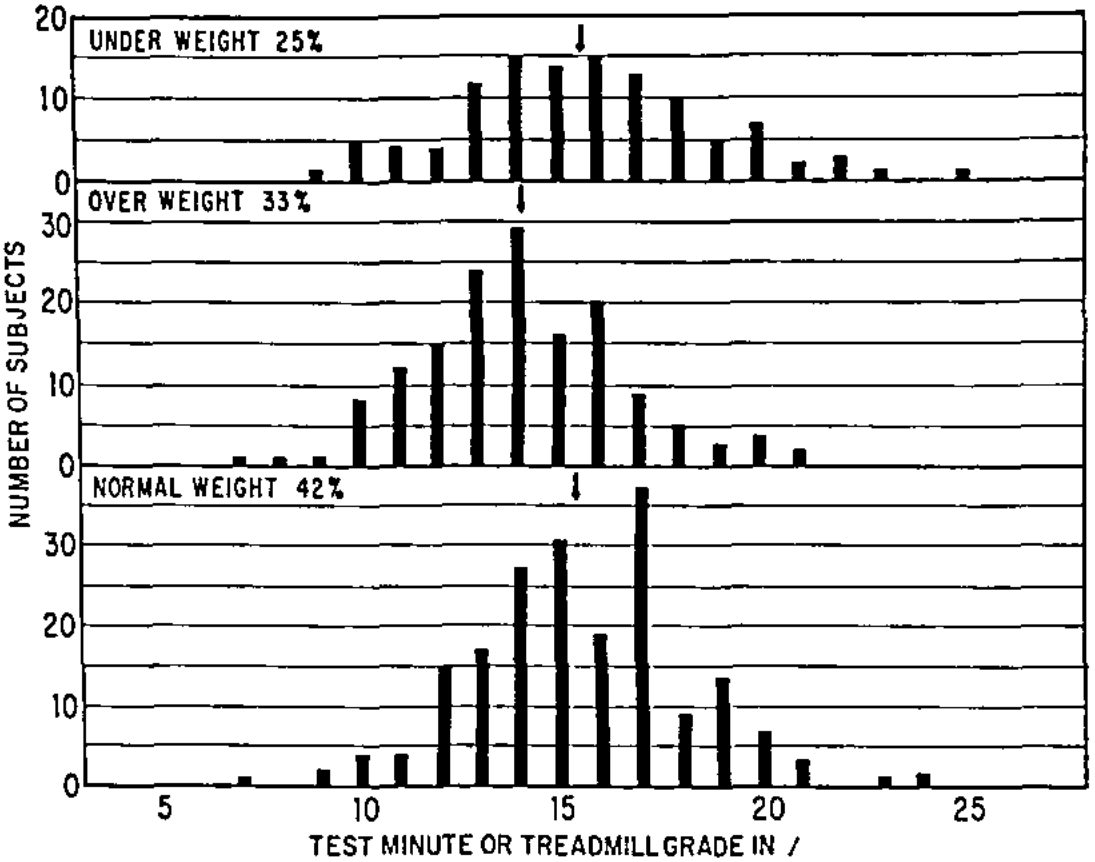
Figure 7 Distribution of the physical fitness and the physiological capacity

Figure 8 illustrates the slight handicap of the overweight type who on the average had a poor work capacity while the normal and underweight men were somewhat better off

Of the 45 persons included in these observations 33 per cent fitted into the overweight group and contrary to our expectation 25 per cent had to be considered underweight—according to the standard used

When the entire test population was divided into the four sub groups—officers noncommissioned officers airmen and civilian personnel—slight differences in the functional reserves between the groups were detected Civilian personnel and airmen had a slight edge with 15 6 and 15 4 minutes of average test duration, officers averaged 14 9 minutes and noncommissioned officers

14 5 minutes (fig 9) For these groups the average oxygen intake per kilogram of body weight was 38, 37 5, 36 7, and 36 milliliters per minute, respectively In the officer group, there were practi cally no variations from second lieutenant to colonel This find

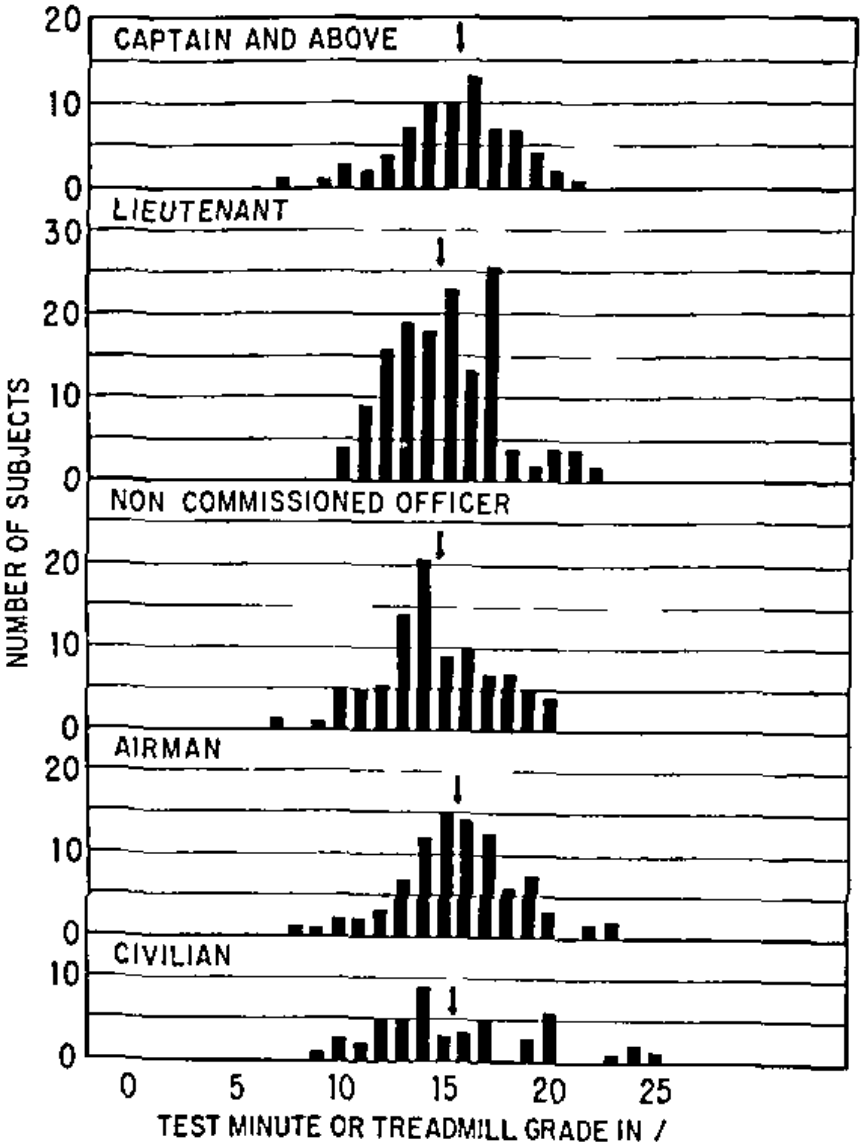


Figu 8 D st ibution of uo k capacity as relat d to the factor of ue ght.

ing is probably somewhat unrealistic because in the higher ranks the experimental subjects were strictly volunteers while the lower ranking officers were mainly selected at random Volun teers for a physical performance test are usually persons with greater interest in occasional or more regular physical activity

An attempt was made to evaluate differences in work capacity as a consequence of smoking habits Figure 10 shows the dis tribution of the test results for the smokers and nonsmokers The nonsmokers (28 per cent of 455 persons) had an average time of 15 4 minutes, which was a slight advantage over the average test time of 14 9 minutes for the smokers On 200 of our experimental subjects with widespread variations in age, the observation was made that up to about 30 years there was no difference in work capacity between the smokers and non smokers Beyond the age of 30 years, however, the nonsmokers displayed greater functional reserves It can be assumed that many of the nonsmokers are more conscientious as to healthful living habits including physical exercise, and that would explain their greater capacity for work On the other hand, it is possible

that the chronic effect of smoking affects circulatory and respi ratory reserves disadvantageously



F gur 9 D t b t f u k p ty a lat d t m l tary k

DISCUSSION

During the past *two or three* years increasing attention has been focused on the shortcomings of physical fitness of the American youth compared with those of other nations It is dis appointing that in several national conferences no agreement has been reached on a clear definition of physical fitness As a con equence studies along this line are open to argument Fverybody delights in immediately *posing the questions Physi* cally fit? Fit for what? In most minds power today rests in ideas in motives in organization and above all in technology Accord ing to this thinking the evolution of the human race should tend toward the development of a strictly cerebral visceral type of

man with more and more neglect of all the body parts and organs which, originally, were vital for survival Unfortunately, a na tion's place among the other nations and it's survival in the eternal struggle between them depends largely on the general vitality of the population History has shown that the great ac

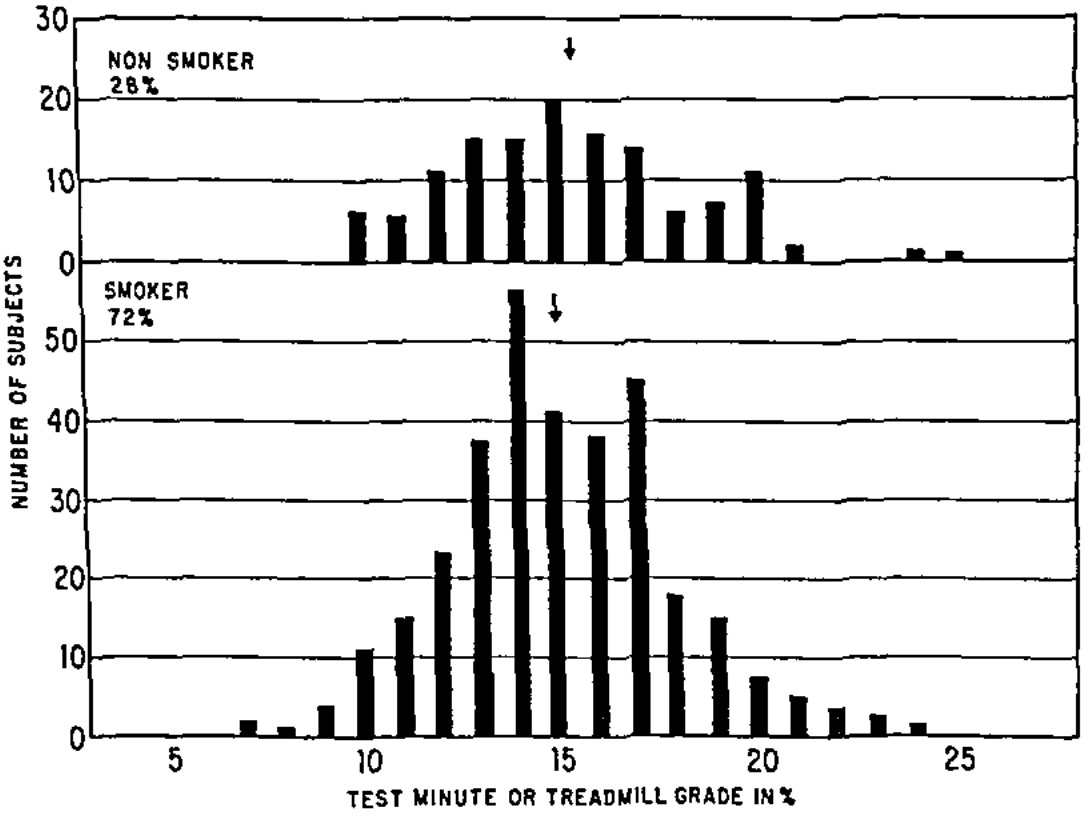


Figure 10 D t ibution of wo k capacity as elated to the hab t of smok ng

complishments of all the ancient nations were destined to perish when a peak of civilization slowly softened the physical resis tance of man against the forces of nature or against the onrush of a more vital enemy We cannot expect this pattern to change in modern times despite all technologic advancements Unless one does not care about destiny of future generations, conscious and sustained efforts should be made to maintain the physical capacities of man at high standards But what are high standards or, even, what are normal standards?

The one physical capacity which most closely determines a man's ability to withstand a variety of functional demands is his capacity for work All environmental stresses occupational difficulties, and health hazards require proper functional and metabolic adjustments, but rarely to such an extent as strenuous physical work It has been shown that work capacity can be appraised The setting of "standards," therefore, is only a matter of collecting the individual performance data of a large popu lation The experimental work of this study was a start in that direction Although the number of about 500 subjects is too small to allow for establishing a definite scale of work capacity, or physical performance capacity," or physical condition," or

aboard the U S S *S lversid s* d ring its fourth war partol on 22 December 1942 by Pharmacist s Mate fir t class T A Moore The procedure performed on the wardroom table with the submarine sub merged t 100 fe t l sted four hou One hour after completion the submar n engaged an enemy dest oyer The following morning the patie t convalesced to th tune of torpedo firing two depth charge tt cks two cr sh dives and an aerial bombing which knocked the pat ent out of h bunk

It remains to be emphasized how ever that there is no record of a death ascribed to appendicitis aboard a submarine during World War II

Currently nuclear powered submarines have a medical officer on board during their major and unusual operational cruises Presumably an appendectomy could be undertaken with less trepidation than in the three aforementioned cases Open drop ether (extremely hazardous in a submerged submarine) or spinal anesthesia attended by an uninitiated assistant with the patient on the wardroom table should be avoided

Hence the rationale for careful scrutiny of prospective and current members of submarine crews in anticipation of such a turn of events A careful evaluation of a man in regard to antici pating appendicitis should become routine during his attendance at submarine school escape tank training and nuclea power school between cruises and during upkeep periods Before being sent to sea any previous history of recurrent or isolated bouts of abdominal pain or suspected attacks of appendicitis should necessitate a man s being seen by the surgeon at the nearest hospital facility ashore Flat films of the abdomen screening for coproliths or any intra abdominal calcifications should become as much a matter of course as the routine screen ing chest films The following cases illustrate this

CASF REPORTS

Cas 1 On 25 Augu t 1958 a 29 yea ld lieute a t from a sub- marin w s s n at th s stat on hosp tal with the chief compla t of pa n in the ri ht l wer bd minal qu drant f r the preceding 24 hou Whe f rst seen by the autho the patient was ading new p pe n th hospital l b ry nd wa anxi u to eturn t his submarine He xh b t d no an rex a mal se o constitutio l symptoms Th r a h t ry f nau e o v miting exot c f od int k vari ti n in bow l hab s o g n t ur n ry dysfu ction Physical ex mination veal d w ll d veloped well nour hed 29 year old m le in acut d tres d abdom n was oft and scapho d Bow l ound wer norm l d th e w s o ev denc of spasm rebou d or fer d pain P a and btu at r signs w e n gat ve Rectal exam n t n reve l d o b ormal f nding Po nt genograms f the ch st a d fl t films of th bd men wer eg t ve The patient s temp ratur was 98 8 F re t lly Th wh t blood c ll count w s C 200 per μl

with a normal differential The urinalysis was negative In short the only two reasons for suspecting abdominal mischief were tender ness over McBurney s point and the patient s history of having been admitted to the U S Naval Hospital Philadelphia Pa seven months previously with the suspected diagnosis of appendicitis only to be discharged after signs and symptoms regressed The decision to oper ate was influenced in the main because of these two aforementioned reasons along with a third—the fact that he was a member of the ship s company of an operating submarine One hour later an acutely inflamed indurated fibrin coated appendix three to four times normal diameter was removed!

Case 2 On 25 June 1958 a submarine radioed the base communi cations center at the New London Submarine Base that it was cancel ling its operations off the Atlantic coastline and returning at flank speed with a patient diagnosed by the hospital corpsman aboard as having acute appendicitis The patient arrived at this station hospital at 0315 on 26 June He was a well developed well nourished 21 year old seaman who volunteered immediately that his symptoms of minimal nausea and vomiting had subsided completely and the right lower quadrant pain had improved "50 per cent The abdomen was soft and scaphoid Bowel sounds were normal There was no evidence of spasm rigidity rebound or referred pain The rectal examination was negative (though previously reported as minimally tender high on the right when examined by the hospital corpsman aboard the sub- marine) Psoas and obturator signs were negative Minimal point tender ness over McBurney s area persisted The patient was afebrile rectally The white blood cells numbered 8 600 per μl The urinalysis was *negative Because of apparently subsiding symptoms expectant treat* ment was elected The following day no abdominal symptoms were present In an effort to anticipate and prevent the recurrence of a similar episode while at sea however elective interval appendectomy was scheduled for the following week and the removal of a normal appendix envisioned On 2 July 1958 seven days later a persistently acutely inflamed retrocecal appendix was removed!

COMMENTS

Recurrent episodes of "appendicitis" diagnosed in retrospect after or during appendectomy are a common occurrence Evidence of previous appendiceal inflammation are seen repeatedly by the abdominal surgeon who performs prophylactic appendectomy during the course of cholecystectomy hysterectomy, or other elective intra abdominal procedures Cases of perforation, pro- ceeding to localization and even to autoamputation at the apper diceal base with resolution of the process and recovery with neither operation nor hospitalization have been reported Deter mining the outcome of any isolated episode in regard to the progression to eventual rupture spreading peritonitis and its attendant morbidity and mortality, remains a matter of pure con jecture

An ag ressive approach among submariners to all suspected cases of appendicitis seems justifiable Nonetheless it seems somewhat extreme to advocate as did some of the medical facilities supporting the crews of the German olfpack Unter seebooten during World War II appendectomy for all crew members regardless of presence or absence of symptomatology I owever it seems reasonable and justifiable to state that 1 Appendicitis is the commonest medical emergency requiring surgical inter vention among submarine crews 2 Appendicitis can be (and has been) the cause of cancelling a combat submarine patrol disengaging an attack or leaving the area of routine peacetime operations 3 The wardroom table of a submerged submarine with its attendant disadvantages is by no means the most oppor tune place for a medical officer much less a ho pital corpsman to undertake an appendectomy 4 The signs and symptoms of appendicitis are prote n often bizarre and occasionally minimal in presentation—belying underlying active inflammation 5 *Previous history of a documented or suspected* attack the presence of an asymptomatic fecalith on screening flat film or point tenderness which persists in the absence of other findin_s in a submariner warrants uncommon scrutiny and close surveil lance

ACKNOWLEDGEMENT Th h w h s t p pp t t C p W l W lh m MC USN M d I Off S bm F U S A lan Flee f h

REFERENCES

1 F R H P f g nfl mm f mif rm pp d d d *Am J M S* 92 321 1886
2 B lm R. M. H Ll yd R P and J h R. R. P f d pp d 391 w h m al y *A. M. A. A h Surg* 74 719 732 M y 1957
3 *Submar ne M d ne P ac* NAVMED P5054 Bur t M d d Surg ry D p rtm f h N y G m P g Off 1956 pp 299-300 304
4 Duff I F M d l S udy f h E p f Subm R d d 1 471 S bmar P tr l R port W ld W II
5 B g R M J B g H M C p l h *I ad I gy* 68 839-844 J 1957

HOW TO AVOID CARDIAC ARREST

I would mak pl a to all exp nts of th art of a sthes ol gy that they be dil gent and onscientious prevent ng the tr gedy of ardi c arrest The reputat on of this profe n and the l ve of the pat ents are at stak Avoid hypov ntil t on w th t v cious ff p ng hypoxia and hypercapni P otect th patient aga st n xious eflexes by prope and dequate p medication Mistrust th hal ge On age t well understood and administered st ll mor aluable than a polypharma utical bar age f wh ch the e aluat on difficult Keep t s mpl be watchful be careful be af —K nneth C lcCarthy The Problem of Cardi c Arr t *Th J tr l h Amer an M d cal Assoc at on,* December 20 1958

STARCH BLOCK ELECTROPHORESIS OF HEMOGLOBIN

HOWARD A PEARSON *Lieutenant* MC USN
WILLIAM McFARLAND *Commander* MC USN

THE technic of zone electrophoresis of proteins using a block of sedimented starch grains as a supporting medium was described seven years ago[1] and first used for hemoglobins in 1955 by Kunkel and Wallenius.[2] However, it is currently available in relatively few medical centers. Many physicians are not familiar with this test and its great value in the diagnosis of certain hematologic conditions, especially thalassemia trait. It therefore is considered worthwhile to describe this technic and to briefly outline its advantages and limitations.

The discovery by Pauling and his associates[3] of sickle cell hemoglobin by means of its difference in electrophoretic mobility from normal hemoglobin gave impetus to a large series of investigations. Other abnormal hemoglobins were rapidly discovered. Diagnosis of the clinical syndromes associated with the various abnormal hemoglobins was markedly facilitated by the development of filter paper electrophoresis, a rapid and inexpensive procedure. For most clinical situations it is entirely satisfactory. However, this method of electrophoresis has certain inherent disadvantages, most important of which is lack of sensitivity in separation of minor components from hemoglobin mixtures. Thus Motulsky, Paul and Durum[4] demonstrated that in concentrations of less than 15 per cent, types S or C hemoglobin could not be regularly detected in artificial mixtures. Zuelzer, Neel and Robinson[5] showed that under certain conditions even larger proportions of abnormal hemoglobins might escape detection. The recently discovered Lepore hemoglobin, which accounts for about 10 per cent of the hemoglobin of persons with Lepore trait, cannot be detected by paper electrophoresis.[6,7]

Kunkel and associates,[2] using starch block electrophoresis, observed a small fraction of hemoglobin distinct from the hemoglobin A of all normal persons. They called this minor component hemoglobin A_2 ($Hb\ A_2$) and showed that in normal persons it

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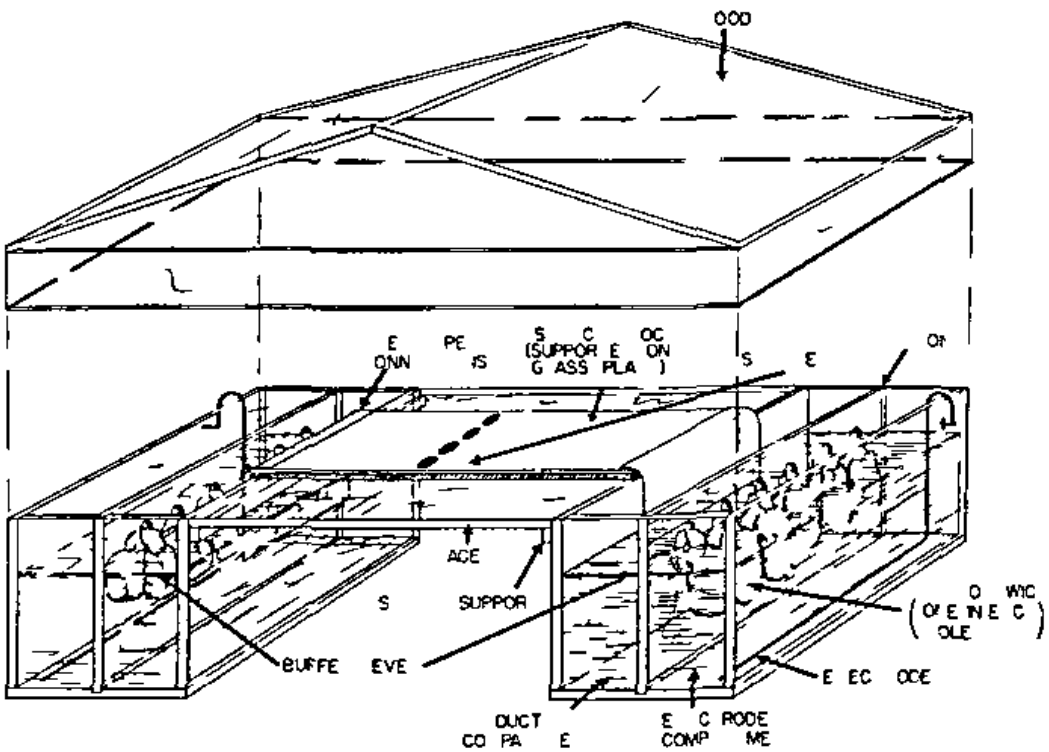
From U. S. Naval Hospital, Bethesda, Md.

accounted for between 1 5 and 3 1 per cent of the total hemo globin In persons with thalassemia trait however Hb A was increased to values above 3 2 per cent The nearly invariable elevation of Hb A_2 in the thalassemia trait has for the first time provided the clinician with a relatively specific test for this condition Because Hb A_2 cannot be detected regularly by filter paper electrophoresis it is in the detection and quanti tation of this and other minor hemoglobin components that starch block electrophoresis has its greatest clinical application

APPARATUS AND TECHNIC

The apparatus and method used by us is that described by Gerald and Diamond with minor modifications

Appa at s The pp ratus (f g 1) is const ucted from he vy plastic The chief c mponents are two rectangular containers which serve s buffer vessels A central partition divides each buffer ve sel length



F g 1 Star b bl k l t phor t app t

w nto l ct ode and c ducting comp rtments The partition i sol d exc pt f fi e holes bove the urface l vel of the buffer Cott w k thr ugh these hole c n ct the buffer in a h compart m nt The buffe essels ar s parated by two plastic sp cer a d piece of gl hold ng the starch block is supported b twe n the medial rims of th buffer v els and spac r convert ng the whol apparatus into cl d un t Dur ng operation the ent re un t s pl ced in a ref ger t at 8 C

Power supply A power supply which will provide currents of 40 to 80 milliamperes at 250 to 400 volts is essential Although a constant voltage apparatus is satisfactory a constant current power supply is ideal Simple electrodes are made of stainless steel

Preparation of hemolysate The blood sample is collected with any standard anticoagulant The red cells are washed three times with cool normal saline and hemolyzed with twice their volume of distilled water and one half their volume of toluene After standing for about one hour in the refrigerator the mixture is centrifuged at low speeds An amorphous layer of stroma and toluene is aspirated from the surface and the hemolysate is then subjected to high speed centrifugation at 25 000 r p m for 30 minutes in a Spinco ultracentrifuge An absolutely clear solution of oxyhemoglobin with a concentration of about 8 grams per 100 ml is obtained In lieu of ultracentrifugation other laboratories have clarified the hemolysate by filtration through an asbestos pad or a bed of asbestos shreds It is extremely important that the hemolysate be free of stroma to avoid trailing and obscuring of the final pattern

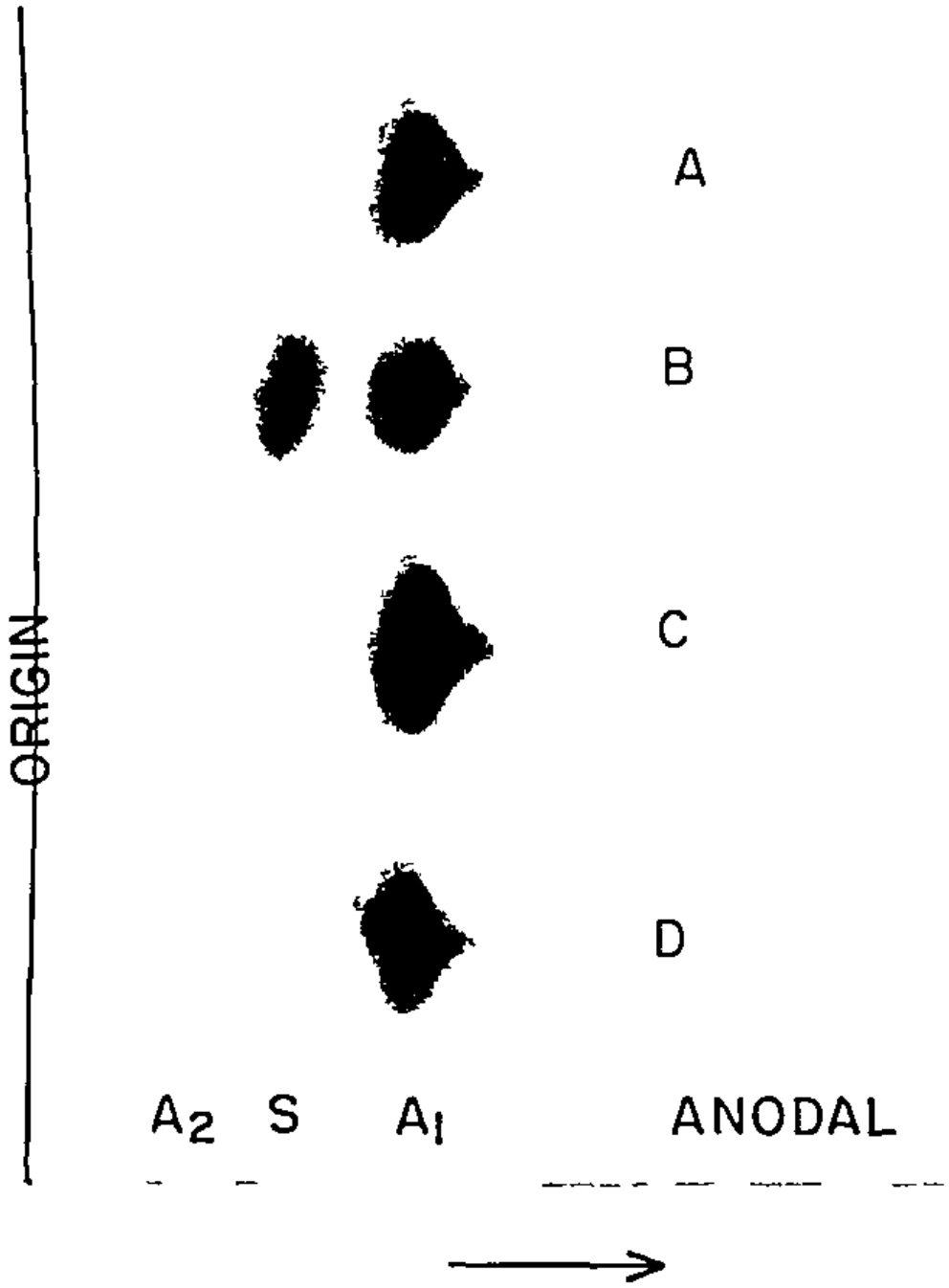
Buffer Any standard buffer for protein electrophoresis may be used For work with hemoglobins a veronal (barbital) buffer of pH 8 6 and ionic strength 0 05 is most useful

Preparation of the starch block A glass plate measuring 6½ by 12 inches is converted into a mold by rimming the long edges with strips of masking tape The short edges are dammed with several thicknesses of filter paper Two hundred grams of analytic potato starch are washed by passing 1 5 liters of buffer solution through the starch in a large Buchner funnel The starch is allowed to sediment for one hour in an equal amount of buffer and the excess buffer and unsettled starch are removed The starch is then stirred into a mixture which pours easily into the above described mold After about 30 minutes the edges of the mold may be removed leaving a solid block of starch 5 mm thick The surface of this is smooth and flat

Application of hemolysate to the starch block Just before starting the run 0 3 ml of hemolysate is converted to cyanmethemoglobin by adding a drop of 5 per cent potassium ferricyanide and a drop of 2 per cent acidified sodium cyanide Four deep slits are made in a row in the center of the starch block with the tip of a spatula Four specimens may be electrophoresed during each run A larger block measuring 10 by 12 inches permits simultaneous running of seven samples Cyanmethemoglobin solution 0 1 ml is evenly inserted into each slit with a tuberculin syringe and No 23 needle The slits are then closed by gentle pressure with a spatula tip

Starting the run The completed starch block is placed in position on the inside rims of the filled buffer vessels in the refrigerator The block is connected to the conducting compartment buffer with three sheets of Whatman No 3 filter paper The electrodes are placed in

their comp rtments and conn cted by leads to the power supply The hood is pl ced o er the ppar tus and the power is turned on The duration of th run is 16 to 24 hours t 48 ma of current



F g 2 St h bl k l t pho B b t l b ff pH 8 6 t gth 0 05 Curr t 48 ma d t on f 22 h (A) N m l A f t f 3 p t. (B) Sickl t t (C) l d f y m a, A f t on f 1 5 p t. (D) Th l m a t t A_2 f t of 4 l p t

Qu t t t f th h m glob f act s Whe the run is complet d the block s m v d and blotted dry If a permanent visu l record is wa ted photog ph m y b t k n (f g 2 th ough 4) The segments

of the block bearing the various hemoglobin fractions are cut from the block and transferred to fine sintered glass funnels The hemoglobins may then be recovered by elution with distilled water and a suction apparatus The A_2 fraction is collected in 10 ml and the A_1

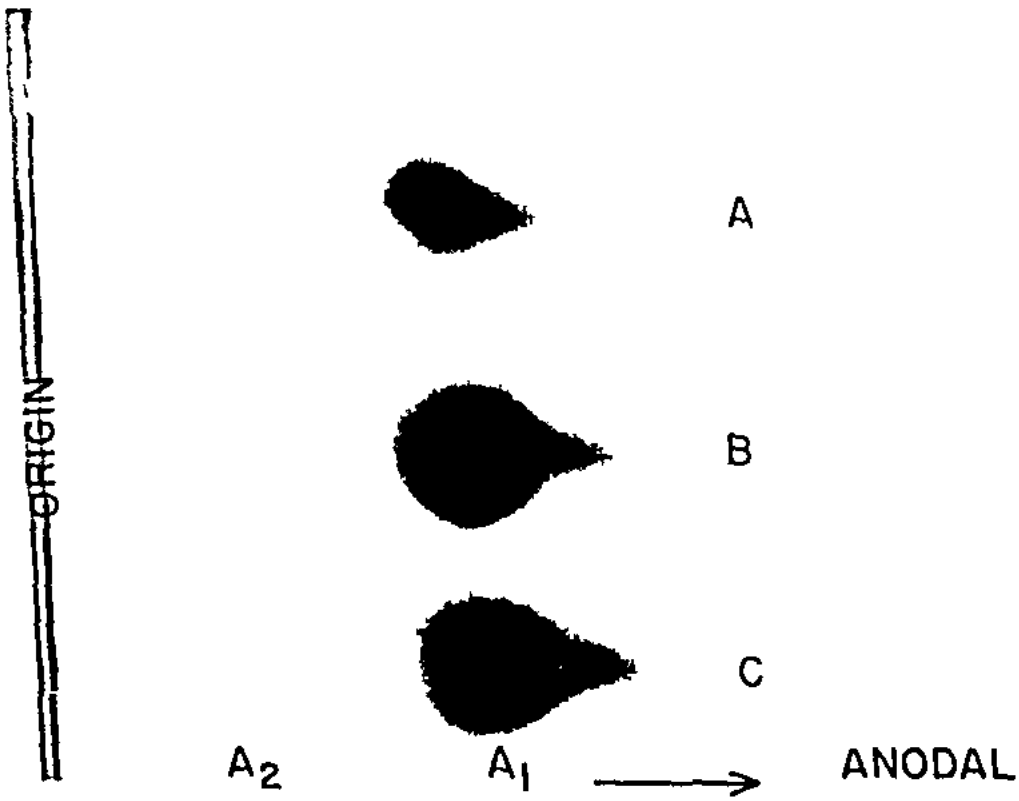


Figure 3 Starch block electrophoresis (A) Normal A_2 fraction of 2 4 per cent (B) Thalassemia trait (case 2) A_2 fraction of 4 3 per cent (C) Thalassemia trait A_2 fraction of 5 7 per cent

fraction in 100 ml of eluate The optical density of each fraction is measured in a Beckman DU spectrophotometer at a wavelength of 415 millimicrons The per cent of A_2 may then be calculated

$$\% A_2 = \frac{\text{O D of } A_2 \text{ fraction}}{(\text{O D of } A_1 \text{ fraction} \times 10) + \text{O D of } A_2 \text{ fraction}}$$

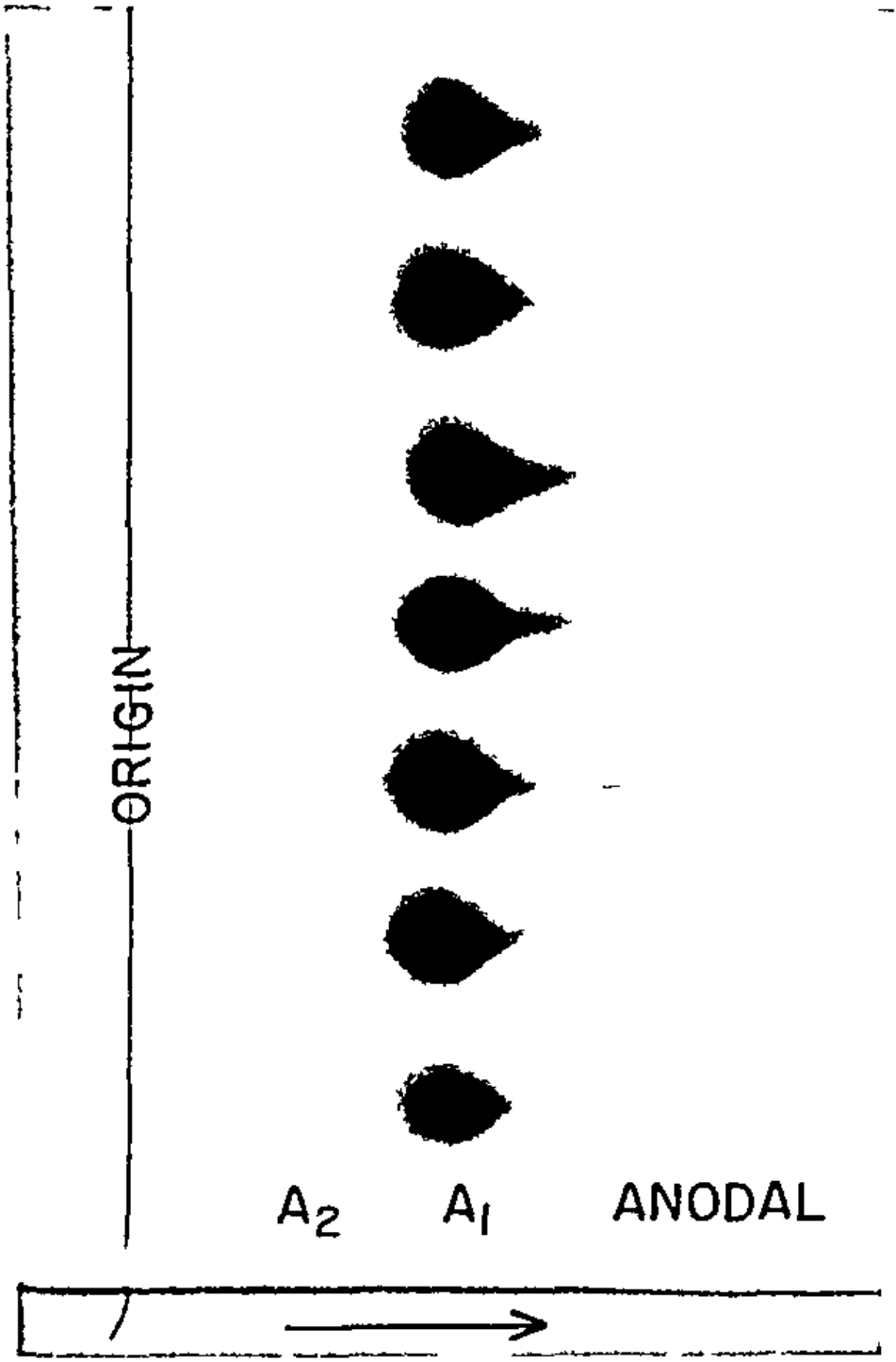
Other hemoglobin components such as S C or F may be quantitated in a similar manner

CASE REPORTS

To illustrate the clinical value of starch block electrophoresis, our experiences with several patients are briefly described

Case 1 A 36-year old woman of Latin descent was admitted to this hospital for evaluation of anemia She was recovering from severe paralytic poliomyelitis Three months previously a moderate anemia had been observed Ferrous sulfate by mouth had been prescribed without rise in the hemoglobin level Examination of the patient s blood revealed a hemoglobin of 10 0 grams per 100 ml and s_ned smear showed hypochromia with many microcytes poikilocytes and

occasional target cells Because of the erythrocyte morphology and the p tient s nationality thal ssemia trait was considered in



F gur 4 Star h block l trophor s. Th s a la g blo k m asur g 10 by 12 he perm tt g the m lt analy f sev sp im ns All f th hem gl b A_2 f act ons ar normal varyi g b tw 1 8 a d 3 0 per cent

th diff nt l d g o Sta ch bl ck el ctroph res s of her hemo lob h wev r v aled an A fraction of only 1 8 per cent

thus excluding thalassemia trait The patient was treated with iron parenterally with prompt rise in the hemoglobin level

Case 2 A 34 year old woman of Scotch Irish ancestry was referred to this hospital for evaluation of chronic anemia Anemia had been observed several times in the past and the patient had been treated with iron on each occasion Hemoglobin was 10 1 grams per 100 ml Blood smear revealed moderate hypochromia and microcytosis with occasional target and oval cells Starch block electrophoresis of the hemoglobin revealed an A_2 fraction of 4 3 per cent (fig 3) Subsequent investigations including ferrokinetic and osmotic fragility studies also were consistent with the diagnosis of thalassemia trait

Case 3 A three month old child of Italian descent was admitted to another naval hospital for investigation of anemia and jaundice Physical examination revealed enlargement of the liver and spleen Laboratory examination disclosed a moderate hypochromic microcytic anemia with target cells and occasional nucleated red cells Bili rubinemia also was recorded Thalassemia major was considered a possible diagnosis Specimens of the parents blood were sent to this laboratory by regular mail Starch block electrophoresis revealed normal Hb A_2 fractions of 2 5 and 2 8 per cent Thalassemia major is a homozygous condition Exclusion of thalassemia trait in the parents ruled out the diagnosis of thalassemia major in the child Further studies established the diagnosis of neonatal hepatitis in this child

DISCUSSION

Thalassemia trait is a mild familial anemia characterized by red cell hypochromia, microcytosis leptocytosis, and decreased osmotic fragility When seen in a person of Italian or Greek ancestry, these features almost certainly indicate the diagnosis of thalassemia trait The red blood cell changes listed above, however, are frequently observed in other syndromes and cannot be considered diagnostic or specific for thalassemia trait In addition typical thalassemia is being recognized in persons with no demonstrable Mediterranean background—as in case 2

The elevated hemoglobin A_2 level demonstrated by starch block electrophoresis has provided the most objective and specific test for thalassemia trait available to date Extensive investigations, both in this country and in Italy, have documented the almost invariable elevation of Hb A_2 in thalassemia trait [8-11] In our experience also, levels of Hb A_2 in excess of 3 2 per cent have been seen only in thalassemia trait Clinically, this procedure has been valuable in quickly and definitively differentiating thalassemia trait from other microcytic, hypochromic anemias

In our opinion, the major disadvantage of starch block electrophoresis is that it is relatively too expensive and difficult to

standardize to become a routine procedure in most laboratories In addition the sensitivity of the technic is not required for most clinical diagnostic problems Fortunately hemoglobin A and most other hemoglobins are stable This permits the mailing of blood samples to a laboratory where starch block electrophoresis is being routinely performed

SUMMARY

The technic of starch block electrophoresis of hemoglobins is described The particular value of this technic lies in its sensitivity in detecting minor hemoglobin components One such minor component is hemoglobin A This is a fraction seen in the blood of normal persons accounting for 1 5 to 3 1 per cent of the total hemoglobin However in persons with thalassemia trait A_2 is elevated above the normal values providing an objective and relatively specific laboratory test for the diagnosis of this condition It is suggested that starch block electrophoresis of hemoglobin is an indicated test of the evaluation of any iron refractory hypochromic anemia

ACKNOWLEDGMENT Th thor w h t pr th pp Dr Park G ld and L K D m d wh l bor ory th t h w l m d C p in E R K g MC USN H d f th Rad p L b ry U S N l H p al B th d Md g h d d ur g m t h p j

REFERENCES

1 Kunk l H G d Sl R J Z El tr ph h pp g m d m *Pr S E p B l & M d.* 80 42 44 M y 1952

2 K k l H G d W ll us G N w h m gl b tm l dul bl od *Scienc* 122 288 A g 12 1955

3 P h g L I H A S g S J d W ll I C S kl ll m m l l d *Scien* 110 543-548 N 25 1949

4 M l ky A. G P l M H and Dur m E L P p l tr ph f b m l h m gl b d l l ppl mpl m q m h d f udy f h d ary h m gl bin p th *Bl od* 9 897 910 S p 1954

5 Z l W W N l J V d R b A R *Abnormal H moglob* l T L M (d) *Progr Hemat l gy* V l m 1 G un & Str tt I N w Y k N Y 1956. p 91

6. G ld P S d D m d L K N w h d ry h m gl b p hy (L p tr) d w h h l m tr *Blood* 13 835 844 S p 1958

7 P ar H A G ld P S d D d L K Th l mi m d *A M A J Di Ch ld.* (I pt)

8 Kunk l H G Cepp ll R M ll Eb h d U d W lf J Ob m b h m gl b mp blood f m l d dual d p t t w h h l m *J Cl n. l vest* 36 1616-1625 N 1957

9 G ld P S d D m d L K D g f h l m tr by h bl k l tr ph f h m gl b *Blood* 13 61 69 J 1958

10 J ph A M M M S S g S. Dw k D d S g K S h bl k l ph ud f huma h m gl b I l d bl d h l m d h h m l g di d mpar w h T l l tr ph *Bl d* 13 543-551 l 1958

11 Mar d Ber C S d l tr f t q bl d m d d ll l b m m l d l m *Haemat l gi a,* 42 (10) 1957 (ppl me) 26

SPINAL CORD INJURIES IN WORLD WAR II

II Operative Findings and Results in 201 Patients

WOLFGANG W KLEMPERER M D

WHILE the statistics (table 6) bring out a certain latitude in the choice of anesthesia in the various spinal cord injuries, two rules were observed These were to avoid spinal anesthesia and where a general anesthetic was used to intubate those patients in whom respiratory embarrassment was a possibility The likely diffusion of the anesthetic agent into the tissues, resulting in inefficient or unsatisfactory anesthesia the danger of introducing or propagating infection in a potentially contaminated field into deeper muscle layers or bony structures, and the limitation of operative time were some of the reasons why spinal anesthesia was not employed in closed or compound spinal cord injuries Also it was feared that an anesthetic agent might add further histologic change to an already damaged spinal cord Table 6 brings out the preference for local anesthetic in cervical levels In cervical injuries that are frequently critical because of impaired innervation of respiratory muscles any additional pulmonary burden such as endotracheal moisture or atelectasis that are sometimes seen following endotracheal intubation may decide the patient s survival Because so many thoracic spinal cord injuries were complete lesions impairing respiratory excursions and since another group had serious chest wounds local anesthesia was used more often than in lumbar lesions With a local anesthetic patients always could bring up secretions and were able to breathe deeply at all times

OPERATIVE FINDINGS

All degrees of destruction of the spinal column and spinal cord were noted Usually the cord damage resulted from bony fragments of fractured laminae driven ahead of the foreign body into dura and spinal cord The foreign body itself was usually not directly responsible for the trauma inflicted to those two structures The time interval between injury and operation was the deciding factor in the appearance of the cord injury In the early phase contusions and areas of softening of the cord could

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be seen only with difficulty the consistency of the cord was eas ier to determine and a softened cord segment could be discovered by very gentle palpation with a finger tip or rounded instrument Later on these lesions became contracted scars with dense adhesions between spinal cord arachnoid and dura and many new vessels between these structures In a few cases damaged or cut spinal roots were seen to have formed neuromas

TABLE 6 *Typ f an th t for spinal d jur*

L l f pin l d jury	A h	Number f pa
C rvi l	L l	32
	G l	12
	P h l d l l 7	
	Eth 5	
Th	L l	30
	G l	47
	P h l nd l l 8	
	P h l 5	
	E h 34	
Lumbar	L l	5
	G er l	39
	P h l and l l 11	
	P h l 7	
	Eth 18	
	E h and p h l 3	
S l	L l	1
	Sp nal	1
	G l	3
	P h l 1	
	E h 2	
U kn w		11

The difficulty of determining the expected clinical picture from the gross inspection of the damaged cord is well known Often it is possible only to confirm the exact level and location of the injury or to state which side of the spinal cord was dam aged A Brown Séquard syndrome or a close variation of it was seen quite often Table 7 was arranged according to the basic operative findings and the effect on the function of the spinal cor l during the first three months after injury In the first group of table 7 in which the vertebra was fractured but spinal dura mater and cord remained anatomically intact the high percen tage of incomplete lesions is not surprising However the velo city ar l netrative power make a striking difference Foreign bodies that perforated the entire body caused complete lesions in 60 pe cen of the cases in the other two groups combined

only 14 per cent were complete spinal cord injuries In the second group, in which visible damage was done to vertebra and dura, each group was actually too small to draw any definite conclusions It appears, however, there is no appreciable difference

TABLE 7 Op and p l df di g 163 b m b f w und g

P f f g body	67 w h rt b fractur d p l rd d dura		36 w h rt b fract d dur perf d		60	
	C pl p l d	In pl p l d	C pl p l rd	In pl p l d	C pl p l d	I mplet p nal d l
Out d p l l	5	27				
Sp l rd in			4	2		
Sp nal d d g d			6	3		
In d l pun l	2	16				
Sp l ord			3	9		
Sp l d d g d			5	4		
In d d p l					17	3
P rf d p l rd					28	0
T ed p l rd					12	0
P f d p body	10	7				

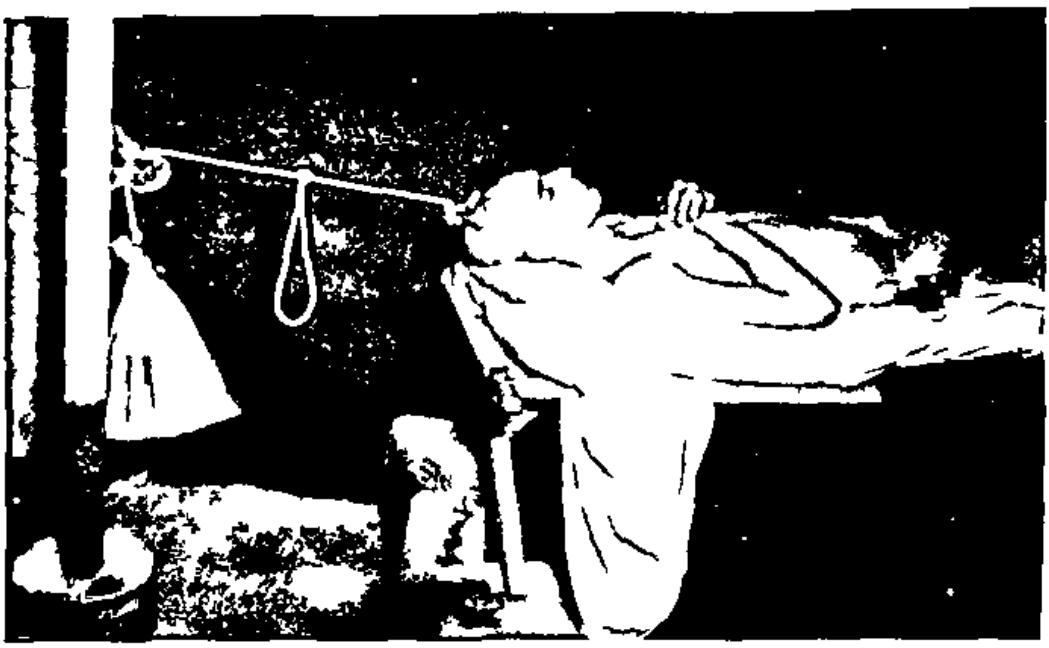
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whether the foreign body ended up outside or in the spinal canal In the former the incidence of complete lesions is twice as common Why the reverse holds true in the latter group of spinal cord injuries where the foreign body was arrested in the canal, leaving the cord grossly intact is not clear In the final group of table 7, where the foreign body ended up in the cord perforated or transected it that any spinal cord injury case should escape permanent, complete damage is surprising Yet, this was noted in three cases caused by small foreign bodies It must be pointed out that this table (table 7) represents findings during the first three months after wounding

INOPERABLE CASES

Of the 201 cases in this series, 22 received no operative therapy 155 had laminectomies 20 had debridements, 9 had Crutchfield tongs inserted (fig 15) and in 5 cases more than one procedure was done or the laminectomy was repeated There were various reasons for omission of operative intervention The most common one was that the patients were simply too gravely wounded and ill, 3 cases, or were dying from shock, aspiration pneumonia, severe compound craniocerebral injury or peritonitis before operation could be considered, 5 cases

There were another eight cases where the associated injuries and their operative procedures were too extensive to expose the patient to any further therapy In five of these it is possible that operative procedures were done at a later date but no records are available to that effect In three cases the initial prominence of the spinal cord signs subsided to leave



F gur 15 I mpl t p nal o d jury at C U of Crut bf ld to g l t bosp t l u th t action p t d t ndb g ot ub l ttach d t t t p l

root signs that were not thought to be in need of operative treatment In three cases evacuated for strategic reasons operative procedures may have been carried out but again no records are available In one case the wounds were too contaminated to allow operative procedure near or through them later on the patient improved enough to be sent directly home In two closed injuries an initially demonstrated block in one patient subsided consequently an operative procedure was unnecessary and in the other case already scheduled for operation sudden death occurred from pulmonary embolus

POSTOPERATIVE COMPLICATIONS

Infection was the most common postoperative complication and it occurred in 23 cases This led to fatal meningitis in three case and in the other 20 cases the infection subsided with appropriate therapy Most common causes of infection were bone fragment (cases) or foreign bodies (5 cases) left in place Their removal in econdary operative procedure was necessary before the infection was controlled Contamination from an infected mediast nal peritoneal or retroperitoneal space communicating with the l al canal occurred in four cases In two in

stances muscle tissue was used to control severe hemorrhage from torn epidural veins and formed the primary site of infection removal of this tissue was necessary to arrest the infection In one case a very large foreign body, with grossly evident bits of clothing, had been removed in the initial laminectomy but had so contaminated the entire area as to cause postoperative infections in spite of repeated washings and postoperative administration of sulfanilamide drugs In one case a time interval of 144 hours between wounding and operation was thought to be responsible for excessive contamination during the procedure and thereby thought to cause the postoperative infection In the remaining two cases no specific cause of infection was obvious Osteomyelitis occurred only twice, it was diagnosed 24 and 46 days after wounding, both patients finally died, their spinal columns having communicated with an infected and purulent mediastinal and peritoneal process

In the early postoperative stages pain syndromes were uncommon they occurred in the form of nerve root pain in only four cases An ascending myelitis, a dangerous complication was seen in five patients, leading to death in two patients as their initial sensory level was C_5 Myelitis usually ascends two segments and was verified at autopsy to consist of softening of two segments up and down beyond the initial site of trauma In the other three cases myelitis was evident merely from a rising sensory level in the thoracic dermatomes and loss of the next two intercostal muscles on the right and left sides Bullets and shell fragments were equally responsible The reverse, a descending sensory level was found in a complete C injury with marked respiratory muscle weakness that improved in a matter of hours following laminectomy at site of trauma with recession of the initial sensory level In three cases function was definitely lost after initial improvement in the first two weeks All three cases were complete thoracic injuries with a certain amount of function of the lower extremities that consequently was lost In one a re exploration showed extensive adhesive arachnoiditis involving all exposed spinal cord segments Other spinal cord segments not uncovered during operation probably were involved No improvement occurred after the second procedure

Almost as serious a postoperative complication and one which certainly is avoidable was a severe depression, apathy or total disinterest observed in three patients All of these were severely emaciated and had in addition to complete lesions, extensive complicating injuries They refused to eat and had simply given up " In each patient improved morale and a fresh approach by personnel in another medical installation worked amazing changes This factor of morale has been stressed by everyone who has had any contact with spinal cord injuries Its impor

tance for eventual rehabilitation cannot be underestimated Good morale especially must prevail as long as the patient requires medical help or assistance Interestingly enough the only instance of a distinct emotional difficulty in the form of an anxiety state or hysteria was observed in a patient with an almost completely recovered incomplete spinal cord injury from a bullet wound at Th complicated by a hemathorax In the light of the seriousness of a spinal cord injury it is surprising that this reaction was not more common It is indicative of the high morale in the hospitals of the patients and of the personnel concerned and charged with their care

CARE OF THE BLADDER

A survey of the care of the bladder shows that out of 119 complete spinal cord injuries 78 patients were kept on urethral drainage with indwelling catheters and 34 had a cystotomy which was done usually in the first three weeks Often enough the decision to do a cystotomy was the result of a policy rather than dictated by the needs of the individual patient In other instances insufficient personnel available in a particular medical installation necessitated this procedure Cystotomies were performed on 12 patients during the first 5 days on 4 patients between the 6th and 10th day on 7 patients between the 11th and 15th day on 7 patients between the 16th and 20th day and on 4 patients after the 20th day No binding rules should be laid down in this respect

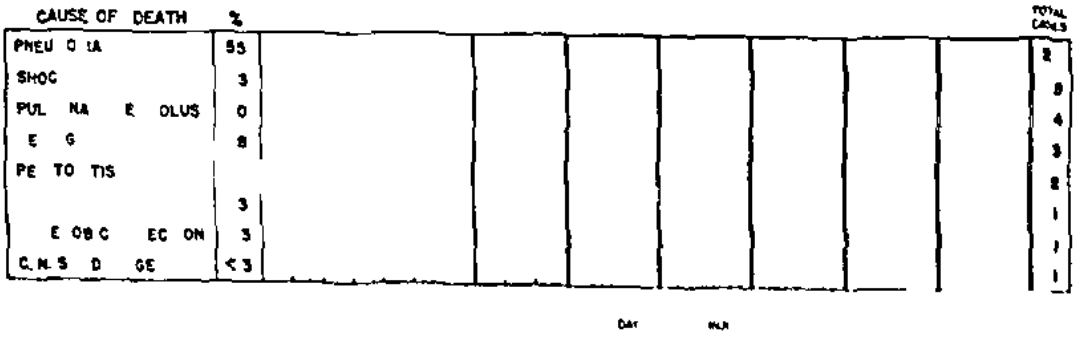
There is no question that urethral drainage while readily available requires more constant care and attention than does a cystotomy But cystotomies may in turn lead to serious neglect as they did in three patients of this group Here the abdominal wounds and bladders were grossly infected with ulcerations around encrusted catheters Operative procedure was required to replace the catheters with fresh ones As a consequence of the operation the patients had greatly contracted bladders and a diminution of bladder volume to below 100 ml or less Therefore thought should be given and the directness and ease of drainage and irrigation in a cystotomy should be weighed against the additional operative trauma and the other dangers mentioned earlier In three cases perineal urethrotomies were done The operations proved to be most impractical and harmful as constant leakage occurred around the catheter keeping the patient s bed wet and causing new or enlarged old bed sores Furthermore these perineal fistulas that were close to the rectum invariably became infected and were most reluctant to close after suprapubic cystotomies were carried out later In incomplete lesions cystotomies were done less readily only six operations were performed There were 24 patients with incomplete spinal cord injuries on urethral drainage and the remaining 59 patients had normal sphincter function from the

beginning Forty of the 59 patients overcame an early difficulty in the first two weeks

DEATHS

Table 8 shows the causes of death and the time intervals from injury to death Over half the fatalities occurred in the first week from aspiration pneumonia in complete thoracic or cervical lesions Interestingly enough of these 21 pneumonia cases only 4 had perforating chest wounds In looking back, it was the author's impression that combined chest and spinal cord cases had a higher fatality rate It speaks for the vigilance

TABLE 8 Time intervals in days from injury to death in 38 cases of spinal cord injury



and care of the thoracic surgeons who worked closely with the neurosurgeons that such a low mortality rate resulted in cases combining these injuries (The total number of spinal cord injuries with chest perforations was 48) The five cases that died of shock had severe perforating chest injuries abdominal perforations (one case) or both, and death occurred in the first four days None of these cases ever reached a status that would permit a laminectomy

In four cases death was due to a pulmonary embolus In two cases this was the result of a cast applied to facilitate transportation These casts were complete body casts and not bivalved Both patients arrived from 12 to 36 hours after application of this cast with markedly edematous legs One died during the actual removal of the cast and the other became dyspneic and cyanotic almost immediately after its removal and died 36 hours later In the other two patients the emboli were due to severe trauma to the lung in one case and a damaged subclavian vein with thrombus formation at the site of the trauma in the other Obviously since the first two cases with emboli formation from improper body casts occurred early in the war the use of body casts was discouraged and no further pulmonary emboli from that source were seen thereafter Some patients in need of mobilization because of marked instability of the spine and fear of increase in the spinal deformity with [illegible] to the spinal cord were placed in well padded

tance for eventual rehabilitation cannot be underestimated Good morale especially must prevail as long as the patient requires medical help or assistance Interestingly enough the only instance of a distinct emotional difficulty in the form of an anxiety state or hysteria was observed in a patient with an almost completely recovered incomplete spinal cord injury from a bullet wound at Th complicated by a hemathorax In the light of the seriousness of a spinal cord injury it is surprising that this reaction was not more common It is indicative of the high morale in the hospitals of the patients and of the personnel concerned and charged with their care

CARE OF THE BLADDER

A survey of the care of the bladder shows that out of 112 complete spinal cord injuries 78 patients were kept on urethral drainage with indwelling catheters and 34 had a cystotomy which was done usually in the first three weeks Often enough the decision to do a cystotomy was the result of a policy rather than dictated by the needs of the individual patient In other instances insufficient personnel available in a particular medical installation necessitated this procedure Cystotomies were performed on 12 patients during the first 5 days on 4 patients between the 6th and 10th day on 7 patients between the 11th and 15th day on 7 patients between the 16th and 20th day and on 4 patients after the 20th day No binding rules should be laid down in this respect

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had mortality rates up to 26 per cent Counting all types of operative procedures, namely, laminectomies debridements and insertion of Crutchfield tongs one obtains an over all mortality rate of 21 per cent Separating from this group the 155 lamin

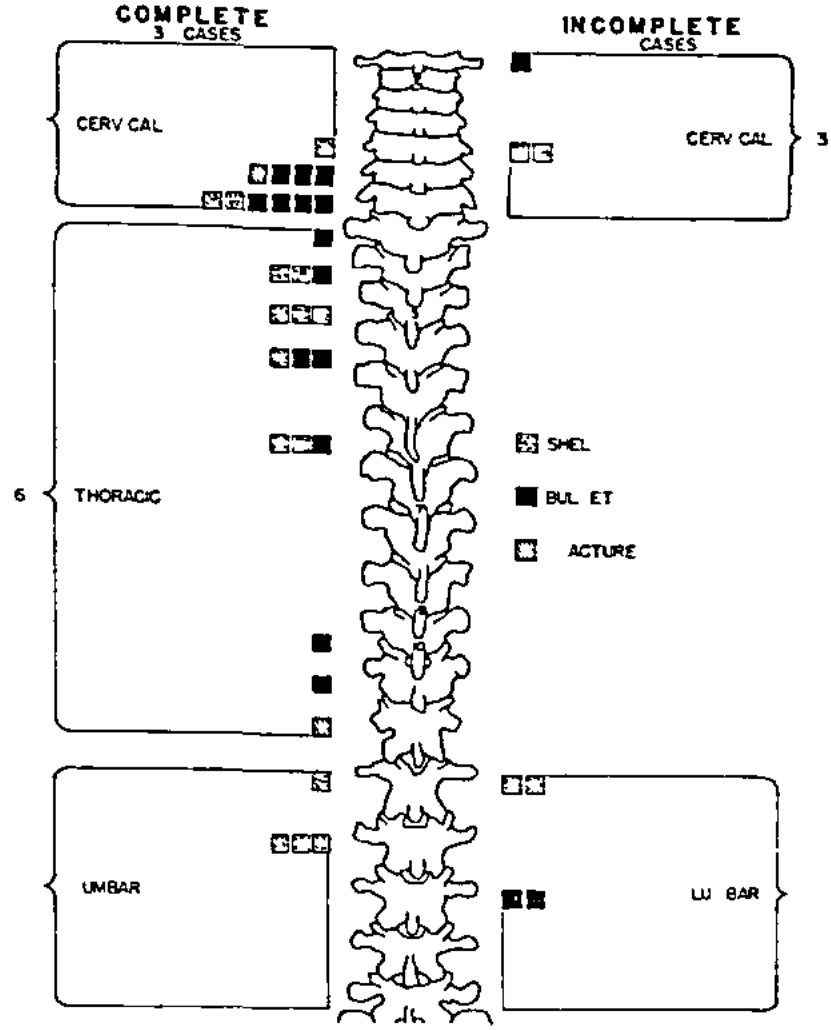


Fig 17 Location cause and extent of spinal cord injuries resulting in death or cases of 38 cases

ectomies with a total of 26 deaths the mortality rate is 17 per cent Since the completion of table 10 10 more American cases have died The causes of death were not obtained It is very possible that in this group of 201 cases there were further deaths among the patients from other nations again it was impossible to obtain additional records or later follow up data As might be expected most fatalities occurred in the area of the cervicothoracic junction and bullets were the most frequently incurred cause (fig 17)

RESULTS AND OUTLOOK

In the fall of 1946 one to four years after the original injury a follow up of the surviving patients of this original group of 201 cases was attempted by mail or visit with physical examination in home hospital or at place of employment Of the

original group of 174 American patients with spinal cord injuries 126 were alive at that time In spite of diligent search by the government agencies concerned only 80 patients or about two thirds of the group could be found The data are sobering (table 9)

TABLE 9 *Status f 80 pat ent with p nal co d jury on t f ur y ar later*

St f p t	33 mpl e p l d jury	47 mpl t p l d jury s
Empl y d	4	22
I tr g	2	1
U mpl y d t tr g	27	24
At h m	11	43
Still h p l d	22	4
W lk g w h ut d	2	36
W lk g w h d	23	11
N t w lki g	8	0
Norm l bl dd	0	32
A tom c or man g bl bladder	19	13
Bl dd dr g urethr l p p bl p	14	2
I l g	24	30
I arm	0	9
I arm d l g	4	4
N p	5	4
B d	16	1

It must be remembered that only one year had elapsed since the end of the war and many healthy young veterans were having a difficult time returning to a productive civilian existence It is *no surprise therefore to see the physically handicapped* even less successful and slower in this attempt to rehabilitate themselves In this struggle the patient s morale resilience and will power are all important The degree of motor and sen sory loss and the amount of pain are only indirectly responsible for success or failure on the difficult road to rehabilitation

By 1946 most of the patients with complete spinal cord injuries were unemployed and only two were in training for a new job both as watchmakers A surprising number of patients with incomplete spinal cord injuries over 50 per cent also were still unemployed Two thirds of the patients with the complete spin l cord injuries were hospitalized most of them were on urin y drainage and still had bedsores Yet with the exception of t l p t ents all had made more or less successful attempts to w lk with tremendous difficulty trying to develop a stron h houlder girdle and sense of balance to master the s th ough gait Over half of the patients with complete

spinal cord injuries had developed an automatic bladder and had learned enough about the peculiarities of their own reflexes to a void embarrassment, soiling or discomfort There were only nine patients who did not have pain from their spinal cord injury, re gardless of whether it was complete or incomplete Most patients had pain in their legs, and a few had pain in arms or in arms and legs In some of the patients, pain was the greatest problem Nerve root sections or spinothalamic tractotomies did not al ways give satisfactory relief Alcohol injections, although quite successful, had at times the unfortunate effect of upsetting a well adjusted automatic bladder, or causing the loss of penile erections

Of considerable interest are the neurological findings in 52 patients seen one to four years after wounding (tables 10 and 11) While originally 80 cases were queried, only in 52 patients was it possible to make detailed neurological examinations and compare the patient's status as recorded at the time of injury with findings three months after treatment and from one to four years later Table 10 brings out the importance of adequate de compression of the spinal cord, that is the necessity of open ing the dura if it is under tension and not pulsating after all extradural obstructions such as laminal fragments foreign bodies, and fluid collections have been relieved This is illus trated by five incomplete and three complete spinal cord in jury cases that failed to improve or even lost function after laminectomies in which the dura, although tightly enclosing the cord, was not opened A considerable degree of recovery of function was shown in 15 other incomplete spinal cord injury cases In these cases the dura was opened adequately if under tension, to allow free flow of spinal fluid throughout the entire operative site This flow can be stimulated by compression of jugular veins and is certainly a helpful test during the operative procedure If the dura was found to pulsate it was left intact as nothing would have been gained by opening it

The other more serious injuries with gross damage to the spinal cord (table 11) bring out two significant findings first, that contrary to the previous group of cases (table 10), it was here not a question of difference in view point by the individual surgeon of whether to open or not to open the dura The dura had already been torn, the spinal cord had either decompressed itself through that tear during the interval between wounding and operation or where depressing laminal fragments or a foreign body prevented that decompression of the spinal cord usually had taken place when all compressing overlying structures had been removed The second finding was that in some cases, the cord would actually "discharge" toothpaste like material leaving a shell of cord, which in the seven complete" cases with direct damage to the spinal cord due to a foreign body (table 11) was

TABLE 10 *Effect of Splenectomy Performed in Combat Casualties in World War II*

Immediate World War II		Splenectomy Performed				
Operative Findings	Splenic Injury	Bacteremia	Wound	Hanging	Improved	Good Result
Lacerated Diaphragm	Operative Findings Indicating Splenic Injury				4 Implied	11 Implied
Diaphragm	Nonpenetrating Injury Found Dead	2 Implied	3 Implied	3 Complete		

TABLE 11 *Effect of Splenectomy during Surgical Recovery of 29 Patients with Complete Ileal Transection*

Immediate World War II Operative Findings	Splenectomy Performed		
	Change	Improved	Good Result
Immediately Identified and Repaired	5 Implete	1 Implet 5 Implet	2 Incomplet
Immediately Identified Splenic Injury Hemoperitoneum Present	6 Complete	4 Implet 1 Incomplet	3 Complet
Originally Identified but Not Repaired	2 Complet		

estimated to range from one fifth to one half of the total spinal cord substance at the involved level That these cases did improve and changed from seemingly "complete" to incomplete spinal cord injuries[6] is proof of the benefit the cord derived from the evacuation of this material which gave the still viable and potentially functioning part of the cord a chance to recover The degree of improvement is of course difficult to tabulate While comparison of table 11 and the second group in table 7 brings out only one "complete" lesion out of 18 improved, the results in the more evident injuries, in which the foreign body lies inside the cord or has perforated it, are more impressive Comparing the third group in table 7 with table 11, out of 45 injuries called complete" up to three months after wounding, 7 changed into incomplete spinal cord lesions of these 7 cases, 3 had regained the use, even if only partial, of both lower extremities this does not take into account the considerable degree of improvement and good results seen in the 15 incomplete lesions of table 10 as compared with the findings in the 18 incomplete lesions of the second group in table 7

An intentional decompression of the crushed spinal cord with release of devitalized cord substance, which in this series was done accidentally by bone fragments or foreign bodies, is not a new idea Allan published a nearly forgotten report almost 50 years ago on crush injuries of the spinal cord in two groups of dogs Both groups had thoracic laminectomies following this a weight was dropped onto the spinal cord that was still protected by dura In one group of dogs, the dura was opened immediately an incision made along the median sulcus and the wound closed in the other group the wound was closed without further therapy Most dogs in the first group regained normal function of their temporarily paraplegic hind legs in the second group recovery of function was the exception In work done on cats[5] with spinal cord injuries from bullets striking the tip of a thoracic posterior spinous process but leaving the spinal canal and its contents grossly intact a cavitation between the posterior columns of the spinal cord was produced with great regularity That evacuation of this cavity or prevention of its formation would be responsible for the resumption of function in the less damaged part of the spinal cord seems an obvious conclusion

No general statement can be made about the patient s attitude toward his illness it ranged from complete apathy in some to resentment and bitterness in others High morale and eagerness to overcome their obvious difficulties were shown by a relatively small number of patients A surprisingly large group of patients with incomplete spinal cord injuries seemed unable to resume an occupation in spite of seemingly not too great physical handicaps All were, of course, eager to learn of any possible

medical advances they had formed groups for purposes of nation al and local representation with their own newspapers meetings hobbies and sports Paraplegics have received a good deal of publicity in the press radio and cinema The outlook is serious for most of them and they know it They are alerted to constant care of themselves regardless of whether a new bedsore or an other urinary infection is threatening And while the main advance lies in better methods of rehabilitation a new approach still of very doubtful value lies in actual regeneration or suturing of the damaged spinal cord which would be a revolutionary solution to a never ending struggle

SUMMARY

A series of 201 patients with spinal cord injuries of World War II forms the basis of this study of a serious war injury Advances in handling of this casualty since World War I its diagnosis treatment complications mortality and a follow up of 52 patients one to four years after wounding are described

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REFERENCES

1 M D D *Th T atment f Acut Comp und Injur f the Sp nal Cord Due t M ssl* Ch l C Th m Sp gf ld Ill 1948

2 Kl mp W St t t l p rt p l d jur *M Bull N African Th ater f Operat ns* 1 12 15 Mar h 1944 Al d fer 3

3 E rt W H d W odhall B M g m t f h d d p nal d jur h *Army J A. M. A.* 126 145-148 S pt 16 1944

4 C l D A. C p I S H T I d Rusk H A. E ly manag m t f p w h p l d jury *J A. M. A.* 151 89-94 J 10 1953

5 Kl mpe W W Fult J F L mp rt H d Sch M. G I d t p nal rd jur due gunsh t w und f p l lumn nimal nd ma *M l. Surgeon* 114 253 265 Ap 1954

6 H A M M g me f gun h w und f h d and p f rwa d h p tal AEF I *Umt d Stat H tory f the World War The M d al Department f th Umt d Stat Army the World War* U S Go m P tung Off W h g- D C 1927 V l XI P rt 1 S t 3 pp 757 789-794

7 Spurling R G Sec d S i al An ly f N ur urg l D t fr m Uk Ba S D mb 13 1944

8 T l y M C mpound jur f p l d *J Neurosurg* 3 306-309 Jul 1946 All A R Surg ry f pe me t l l f p nal d qui l crush jury f f ur d l f p l lum p lmi ary p rt *J A. M. A.* 57 8 8-8 0 S p 9 1911

10 W W F and Ch mbe W W R g t p nal d f t d d g *J mp Neurol* 3 241 257 Oct 1950

GROUP PLANNING PRIOR TO DISCHARGE OF MILITARY PSYCHIATRIC PATIENTS

JACK A DAVIS *Captain USAF (MSC)*

PATIENTS in a psychiatric ward of a military hospital have many realistic problems but the patients who are to be discharged from the armed services as a result of their psychiatric illness have many *in addition Some of these problems* are similar to those of psychiatric patients at a civilian hospital but in many aspects they are unique The patient is usually away from home and may not have the support of his relatives during his period of turmoil when he is struggling with many conflicting feelings about himself and the things that are happening to him The patient often thinks that he has failed himself, his relatives, and the service He feels rejected by his friends in the service, by his doctors, and by the armed services who now tell him that he is not qualified to serve

The young recruit sees the service as a challenge He is particularly resistive to returning to his home community a few months after enlistment and having to explain why he is back home so soon He may equate his ability to remain successfully in the service with his masculinity The more seasoned service man often looks to the service as a great father who expects service and obedience from him, but who in return offers security and status He resents being sent from this protective environment to a civilian community that he has left years ago and which now seems cold, strange and frightening In the past this veteran of many years of service may have been unusually critical of other servicemen who were "unable to take it" At the same time, the patient with many years of service believes that he has given a great deal to his country only to be thrown out now that he is no longer considered useful

FUNCTIONS OF SOCIAL WORKER

Some of the functions of a social worker in a hospital setting include helping the patient deal with realistic problems related to his illness and in helping him plan toward his release from

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the hospital when he must grapple with vocational and social problems which have been altered as a result of his illness The patient may look to the social worker as a friend with whom he may express his feelings of anger resentment helplessness and dependence The social worker often may help him to better understand the hospital procedures and regulations that may make little sense to him He may experience acceptance on the part of the social worker who will help him to appraise his situation more realistically

In order that the needs of psychiatric patients in a hospital setting be met more fully predischarge planning on a group basis was initiated at this hospital late in 1957 It was believed that the values which would result from the group process could not be secured by working on an individual basis This large general hospital serves servicemen and their dependents from the far flung bases both in this country and overseas

GROUP COMPOSITION

Patients whom the ward psychiatrists had determined would be recommended for discharge from the Air Force as a result of their psychiatric illness composed the group These patients needed to be well enough to participate to some extent in group discussion Patients with various diagnoses were included but those who were unusually paranoid were excluded Some pa tients had only limited contact with their environment but seemed to have an awareness of what was going on in the group After a few days the social worker was able to judge whether the pa tient would be able to continue in the group with benefit The size of the group varied from about 8 to 12 The composition and size of the group was constantly changing as patients left the hospital for civilian life and others were added

PROCEDURE

The responsibility for the group sessions was that of two Air Force social work officers The leader was the chief social worker and the assistant was the closed ward social worker who frequently dealt with the patients in their daily contacts The responsibility for the over all activity rested with the leader The assistant leader had a more intimate knowledge of each pa tient as a result of his daily contacts with them and he knew what was happening to each one from the standpoint of admini strative action taken toward discharge from the Air Force Both workers would answer factual questions concerning the hospital the administration status of their cases and knowledge of com munity resources The senior leader had the responsibility for redirecting questions and helping the group to focus on problems which interested the group The assistant worker also often participated in these functions

Meetings usually were opened by having any new members introduced to the group The new member might be asked to tell a little about himself A simple explanation was made by the worker that the group met regularly twice a week in order that it might consider some of the problems that the patients faced here in the hospital as well as in their future civilian life An invitation was then made for questions or suggestions from the group Often problems which had come up since the last session were raised Sometimes the patients had been thinking about issues brought up in a previous session which they wished to continue A simple question often led to the topic for discussion for that day's session Should no specific questions be raised, the leader was ready to explore with the group some areas of concern which might be of interest to them

All members were encouraged to participate in each meeting Usually members responded spontaneously, however, some members were encouraged to express themselves by one of the workers suggesting to them that they might have some ideas about the subject or some experience which would be helpful to the group Although most patients took an active part in dis cussion during the first session they attended, some needed to wait several weeks before they felt secure enough to participate

Except for factual questions that usually were dealt with at the beginning of the session the worker turned the questions that were raised back to the group for discussion

ROLE OF THE SOCIAL WORKERS IN THE GROUP

Feelings of rejection seem to be universal among psychiatric patients These are heightened in the service because the pa tients are not able to make the decision as to whether or not they will be recommended for discharge Feelings of rejection often are expressed by blaming former officers, the hospital personnel and particularly the doctors who may have recommend ed discharge from the Air Force The role of the social workers in the group activity was to give acceptance and understanding to the patient's feelings In addition, they helped the group to explore areas of interest they know are the concern of most psychiatric patients leaving the service The social workers help the patients deal with realistic problems while in the hos pital, such as waiting for physical evaluation boards They are a catalyst in stimulating thinking and discussion about problems without giving the groups the answers to such problems They also are a resource for the group when it needs to know about available hospital services and community agencies which may help them work out a more satisfactory adjustment in the future

The group discussions supplement the amount of individual casework that is given by the social workers Patients are en

couraged to bring their problems to the group rather than seek individual help When further discussion with a patient is indicated this is available Group discussions also supplement the individual therapy which the patient receives from the psychiatrist or other members of the staff

EMPLOYMENT

One of the patient s chief areas of concern was that of finding a job once he entered civilian life This problem often seemed insurmountable to veteran servicemen who had been out of touch with civilian industry for years Many expressed hopelessness in being labeled psychiatric patients The leaders brought into the discussion tangible resources such as the state employment services the training available through the Veterans Administration or through state rehabilitation agencies positive and definite channels toward which members of the group could direct their energies Many patients who recently had been in civilian life told of their civilian experiences in securing employment Each member was encouraged to discuss his own background and his plans when he left the Air Force When a patient expressed despair because of no definite resources or plans other members of the group often supported him by their suggestions such as seeing relatives or friends for help in securing employment The group feeling developed in all members and more frequently they saw their common problems Many gained satisfaction out of being an authority in the group concerning some type of work For example one patient a former salesman secured a great amount of support and satisfaction by telling of his experiences in selling and suggesting to the others how they might get into this field Some patients had feelings of competency in discussing their vocational field but little competency in other areas

One of the baffling problems which patients on a psychiatric ward face is what and how much to tell a prospective employer about their illness Nearly all feel that their illness will be a tremendous handicap They often express their own feelings of worthlessness as a result of their psychiatric illness Some declare their intentions to say nothing about past psychiatric illness and others suggested that the entire background must be explained in detail During some sessions the patients practiced the process of applying for work by role playing with one patient taking the part of the employer and the other of the employee The experience related during the role playing showed that the patients had a need to give a great amount of information about their psychiatric illness even though it might not be required Apparently their own feelings of guilt about wanting to withhold information resulted in their telling more than normally would be expected

Many of the patients were unrealistic about employment opportunities They thought in terms of skilled jobs and high salaries but at the same time believed that they were not ready to handle any kind of a job The discussions were focused to help the members of the group assess their own potentialities and make realistic plans towards securing employment

FAMILY

Next to employment, the neuropsychiatric patients were concerned with their families Many patients, particularly those who had difficulty in accepting their illness, postponed telling their relatives about it They may have explained their condition by suggesting in their letters that they were in the hospital for an upset stomach or headache Others in the group frequently challenged such behavior and helped the patient to deal more realistically with relatives Patients often told of the acceptance of their illness by their relatives, which in turn gave other patients who had postponed writing relatives the facts more courage to deal with reality

Most patients were able to recognize that they needed the support of others, which usually came through family relationships They frequently described their feelings of being left out and of not being needed

SOCIAL RELATIONSHIPS

During group sessions much concern about social relationships seemed to be expressed Many patients were concerned as to what people would think about their illness once they re entered the civilian community One patient opened a session by the following statement "Everyone says and does some peculiar things at times, but if we as former psychiatric patients do these things people will say that we are still crazy" Many of the patients had isolated themselves in the past and had little awareness of their need to associate with others in the community if they were to experience good mental health The function of assisting with routine ward tasks and recreational activities in the hospital were discussed to help the patients recognize their need for activity and social contacts which were satisfying and supporting The likelihood of a patient finding activities of a similar nature in his church, club, or settlement house were discussed Again role playing was used to help the patient visualize his first contacts with old friends in the home community The patients in role playing were given the opportunity to walk down the street and meet an old friend portrayed by another patient His own explanation as to how he would handle this meeting was encouraged

MENTAL HEALTH

Most patients in the group expected to stay mentally well Some however had experienced one or more previous episodes and had some concern about their ability to stay well Patients were encouraged to discuss their own ideas about the reasons why they became ill Usually the assignment in the Air Force was given as the cause In addition limited recreation separation from family and overseas duty were often included Patients developed awareness of some of the types of stress which may contribute to psychiatric illness They were helped to consider how they might avoid becoming ill in the future Many believed that they would have no difficulty once they were away from the military environment Most seem to recognize that they must seek help in the future if problems developed in such a way that they felt unable to cope with them The group usually came to recognize that they should seek a physician clergyman social worker or friend with whom they might share their problems The leaders had discussed with the group the social resources found in most communities such as the aid of the family physician Veterans Administration services clinics hospitals social agencies clergymen and counselors

EVALUATION

Patients who were about to leave the group through discharge were interviewed individually to secure their assistance in evaluating their experience in participating in the group Most thought that the opportunity to express their feelings to others who were receptive and understanding was of greatest value to them personally Others stated that an important benefit of group participation was that it helped them to recognize that others had experiences and problems similar to theirs as a result of illness Most expressed the recognition of having similar problems by saying that they had decided that they were not so different after all Some patients said the group feeling cohesiveness gave them security to move ahead when they had been unable to do so previously Others mentioned that their plans now had had an opportunity to crystallize as a result of discussion role playing and a better knowledge of community resources

As a result of the group activity on the ward patients seemed less restless and their attitudes toward the hospital personnel improved Many would continue discussions which were originally begun during the scheduled group sessions Others would bring to the group for discussion controversial issues which had occurred on the wards Some who had formerly isolated themselves formed relationships with other group members Patients looked forward to the sessions and would ask the social workers about the next session when they met in the hall The greatest test

of the group s effectiveness, which has not been measured would be the adjustment that these patients make in civilian life

SUMMARY

Patients on a psychiatric ward, who are to be discharged from a military service undergo a period of transition accompanied by stresses which include feelings of rejection, weeks of waiting with a limited understandin_ of what is happening to them, concern about entering the civilian community in which they must secure employment, and the problems of adjusting to friends and relatives Predischarge planning on a group basis enables the patient to express feelings about himself It helps him to better understand what is happening to him administratively It gives him a feeling of companionship and security with others whom he finds have had experiences during their illness similar to his own It helps the patient explore the problems which he will meet in civilian life and to develop his own solution to these problems The social worker must accept members of such a group with understanding, act as a catalyst in discussions without giving the solutions, and serve as a resource concerning both the hospital and its facilities and the agencies in the civilian community which may be needed in the patient s future rehabilitation

Predischarge planning on a group basis can be used effectively and more widely with types of patients who have experienced prolonged hospitalization and severe illnesses Groups may include both patients who are being discharged from the service and those who need to be psychologically prepared to meet the problems of returning to duty

REFERENCES

1 B tty R V d Cun gh m E L G up th py with m d c f p ti ts *U S Armed Forces M J* 9 391 397 Mar 1958

2 Rundl F L d B gg D L D l pm t f th pe t c mmun ty p bl m n unt d d ly c mmunity m g *U S Armed F rces M. J* 8 1339 1349 Sept 1957

3 Rundl F L d Br gg D L B g g of ther p t mmunity tabl h g g p m t g l d wa d *U S Armed Fo c M. J* 8 811 819 *Jun* 1957

4 W lm r H A. Psych tr c rvi s h ap c mmun ty *U S Arm d F c s M. J* 7 640-654 May 1956

5 W lm r H A P ych tr r c a th p t c c mmun ty- 10-m *th study* c f 939 p t ts *U S Armed Fo c s M. J* 7 1465-1469 Oct 1956

6 J M Co pt f th t p t c c mmun ty *Am J Psychiat* 112 647-650 F b 1956.

7 B gg D L d St ar L D l pm ts t s cial p ych try ob erv t on in 5 l ted E gl h h p l *U S Armed For es M. J* 8 184-194 F b 1957

Dermoid Cyst of Thyroid Gland in an Adult

GERARD NOTEBOOM *Capt MC USAR*
ERICH A EVERTS-SUAREZ *Capt MC USAR*

TERATOID TUMORS of the thyroid gland are rare Herbut classified teratoid tumors in general as epidermoid cysts consisting of ectoderm only dermoid cysts consisting of ectoderm and mesoderm and teratomas consisting of ectoderm mesoderm and entoderm Recently we found a dermoid cyst of the thyroid gland in a 19 year old youth which is reported because of its rarity

REVIEW OF LITERATURE

Teratoid tumors in or in the vicinity of the thyroid gland are mainly embryonal teratomas which have occurred in stillborns newborns and infants There are only four reported cases in adults In 1908 Lurje described a malignant teratoma of the thyroid gland in a 53 year old woman The following year Haechter described a carcino sarcoma of the thyroid gland in a 71 year old man The multiplicity of tissues found in the tumor however forces one to consider it as a malignant teratoma Eleven years later (1920) Fritzsche reported a malignant teratoma of the thyroid gland in a 41 year old woman In 1954 Buckwalter and Layton described a malignant teratoma of the thyroid gland in a 23 year old woman Two instances of dermoid cysts in the region of the thyroid gland are recorded in the literature one by Crotti in 1902 and a second by Greene in 1925 Greene's patient was an adult Microscopically both cysts were lined by skin with sebaceous and sudoriparous glands but lacked the presence of thyroid tissue in the wall making them unacceptable as true cases of dermoid cysts of the thyroid gland In 1956, *Goldberg and Harvey wrote an article on squamous cell cysts* of the thyroid gland These also differ from dermoid cysts in that they lack skin appendages and thyroid tissue in the cyst wall Perusal of the literature has failed to reveal any other similar cases There are no recorded cases of true dermoid cysts of the thyroid gland

CASE REPORT

A 19-year-old man was admitted to this hospital on 18 August 1958 because of fainting spells At the time of examination a firm nodule

From the U S Army Medical Laboratory Fort George G Meade Maryland Dr Noteboom now 1200 Hurley Avenue Fort Worth Texas

was palpated in the right lobe of the thyroid The nodule moved with deglutition No other masses in the thyroid were palpated The remaining physical examination findings all laboratory studies a roentgenogram of the chest and electrocardiograms were normal On 8 September the patient was submitted to surgery under general anes thesia At operation the left lobe of the thyroid was palpated and was thought to be within normal limits The right lobe contained a cystic mass in the anterior surface of the superior pole This mass was sup-



Figur 1 Cut surfaces of dermoid cyst showing hai s and grumous material in lumen.

plied by branches of the superior thyroid artery After ligating the right arterial and venous branches to the gland a right hemithyroidectomy was performed In addition the isthmus of the thyroid was excised at its junction with the left lobe The operative site was closed fol lowing the usual procedure The patient left the operating room in good condition

PATHOLOGIC FINDINGS

Macroscopically the specimen revealed a portion of thyroid gland weighing 10 grams and measuring 4 by 2 5 by 3 centimeters It had been fixed in alcohol and was pyramidal in shape On the anterolateral aspect was a cystic mass 2 cm in diameter It produced a semilunar depression in the right lobe of the thyroid This mass was adherent to the gland and covered by the true capsule of the thyroid A small opening had been surgically produced in the anterior surface of the mass Through the incision an abundant amount of grumous white ma

terial was v s ble The cy t c ma s w s separ ted from the rest of the thy oid tis ue w th only slight d fficulty The cyst was lined by a p nk g ay membrane 0 1 cm in thicknes It contained a mixture of h irs and wh t amorphous material (fig 1) The rest of the thyroid tissu h d a beefy red cut surface No other cystic or nodular m sses were pr sent



F gu 2. N te q amo p th l m l g cy t bac gland and thyr d ac u ll

Microscop c xamination ev aled the cyst to b l ned by l w squa m u epitheli m which rested on conn ctiv t ue contai g ebaceous l nds and thyr id follicl (fig 2) The thyroid acini present n the w ll f the cy t were of ave ag ze l ed by c bo d l to flat ened ep th l um and co ta ned abunda t mounts of colloid in the lumen The e t of the thy o d gland sh w d no ar as of h m r ha e or tumor odul

DISCUSSION

The two criteria for accepting the thyroid gland as the site of origin of a teratoid tumor as given by Bale[20] are that the vascular supply of the tumor be derived from thyroid vessels, and that thyroid gland tissue be present in the wall of the tumor In the present case the tumor was attached to the thyroid gland, covered by its true capsule, and received its blood supply from the superior thyroid artery The tumor therefore fulfills the enumerated criteria

In order to understand the possible histogenesis of a dermoid cyst in the thyroid, it is necessary to review the embryologic development of the gland Near the end of the fourth week of embryonal development the median thyroid diverticulum arises from the floor of the pharynx between the first and second pharyngeal pouches This primordium becomes bilobed and moves caudal along the ventral aspect of the pharynx By the seventh week it is down at the level of the primitive larynx and consists already of lateral lobes with a narrow isthmus On the caudal aspect of the fourth pharyngeal pouch are developing small diverticula, which by some are considered as rudimentary fifth pharyngeal pouches There is strong evidence that these 'postbranchial bodies" become part of the thyroid gland and are included in the substance of the gland It seems possible that in our case the right postbranchial body for reasons unknown, failed to follow its normal course and developed into a dermoid cyst

SUMMARY

Teratoid tumors of the thyroid gland are rare There are only four recorded instances of these tumors in adults All four cases were malignant teratomas The first known case of a benign dermoid cyst of the thyroid gland in an adult is presented A brief discussion as to the pathogenesis of the condition is given

REFERENCES

1 Herbut P A *Surgical Pathology* Lea & Febiger Philadelphia Pa , 1946 p 258

2 Dietrich W Ueber congenitale Tumoren der Schilddrüse *Langenbeck's Archiv f klin Chir* 67 1902

3 Cretney F B A case of teratoma of neck *Lancet* 2 1433 Nov 28 1903

4 Pick J Ein Teratom der Thyreoidea Inaug Diss Univ Würzburg *Virchows Arch f path Anat* 181 101 134 July 1905

5 Herbut P C Teratoma of the thyroid gland *Ann Surg* 131 101 1020 1950

6 Hunziker H Die Teratome der Schilddrüse mit besonderer Berücksichtigung der Frage ihrer Entstehung und klinischen Bedeutung *Beitr z Geburtsh u Gynäk* 13 448 474 1908 1909

7 Ehlers H W F Ueber ein Teratoma embryonale der Schilddrüsengegend *Beitr z path Anat u z allg Path* 57 46 56 1914

8 Haddad K Ein Fall von Schilddrüsenteratom *Bull Mém Soc Anat Paris* 96 1004 Dec 1921

9 Kramer J Ein Teratom der Schilddrüse *Centralbl f allg Path u path Anat* 32 483-485 May 15 1922

10 H d ma R E F ll T t m d S hilddrus g g d *F ankfurt Zt br f Path.* 32 245 258 1925
11 T mm H U b T ra m d S h ldd us *Be t z. kl n. Ch* 134 230-234 1925
12 B ll J W Embry mix d t mo f thyr d *J A. M. A.* 86 1616 May 22 1926.
13 Cust H Zur k t d T t m d S h lddrus *F ankfurt Zts br f Path* 33 125 140 1925
14 Saph O T m f k *Am. J Path* 5 313 22 May 1929
15 L P nd M h t A D ux ll b d t me d l g tv l *Ann. d anat p th* 5 953 962 D 1928
16 B ll L P Tum f ck m l t g thyr d di W t *J Surg* 38 584 594 O t 1930
17 F M d P P U d t ra m d l g tv cal *Am. d'anat Path* 8 1245 1251 D 1931
18 Pus h L C nd N l C M C ng t l toma f thyr d gl nd t port f w th r w f l tut *Am. J Cancer* 23 791 796 Ap 1935
19 P tt E L T tom f thyr d gl nd *Ar h Path.* 25 689-693 May 1938
20 B l G F T tom f k g f thyrό d gl nd w f l t tur d p rt f 4 *Am. J Path* 26 565 569 J ly 1950
21 Wh R. R (R h t N Y) d G lsn R. S T m f k wbom f t s p tt *Ped atric* 9 565-570 M y 1952
22 F E B B k M. R d B w W F Teratoma f byro d gl d f t *U S Armed For M. J* 9 736-739 M y 1958
23 Lurj M. U b T m d S h ldd us *Inaugural D ertat n.* J J M Zur h 1908
24 W h H U b C o-S m d S h ldd us *Inaugural Di ertat on.* F burg 1909
25 F t h R U b m l g mb y l T ra m d S h ldd us g g d *Ar h f kl n. Chir* 114 317 331 1920
26 B kw lt J A ø d L yt J M. M l g ma by d gl d f d l *Ann. Surg* 139 218 223 F b 1954
27 Cr tt A *Thyroid and thymus* 2d d Le d F b g Phil d lph Pa 1922 p 97
28 G E Q d m d d l d *Bol Soc de C de Ch l* 3 201 203 Aug 26 1925
29 G ldb g H M d Harv y P Squam -c ll y t f hyr d w th p l f l gy f quam us p th l um huma thyr d *Br t J Surg* 43 565 569 M y 1956

THE ENTERPRISE OF FREE MEDICINE

There are few people tod y that would deny th t the United States h s the be t medical care in the world and it certa nly has the best teaching centers Students are now com ng to this cou try for study wh reas bef re the war many students were going to the Eur pean centers for tra n ng It is no coincidence that this s the o ly maj r country in the world where the enterp i e of free medicine still exist One cannot escape the conclusion that good medical care and freedom go hand n hand and that good ar cannot ex st in an atmosph re de o d of freedom —John Re d B wn Pr te Practice of Medic ne *Detroit M d cal N ws* March 2 1959

Impending Crisis in Addison's Disease During Oral Surgery

JOHN D LEWIS *D D S*
CHARLES A. McMAHON *Major USAF (DC)*
A. F BLOODWORTH *Captain, USAF (MC)*

PATIENTS with Addison's disease are known to tolerate stress very poorly The physician, however, is frequently surprised at the small amount of stress required to actually precipitate a condition of impending crisis In the following case there was a history of three previous episodes of crisis

CASE REPORT

On 4 October 1956 a 43 year old white woman was admitted to this hospital for oral surgery The patient stated that she had consulted several dentists in the community regarding a painful abscessed tooth but upon learning that she was under medical treatment for Addison s disease none of the dentists would consider treating her The last dentist with whom she consulted referred her to an oral surgeon who recommended hospitalization and medical consultation prior to extraction of the tooth

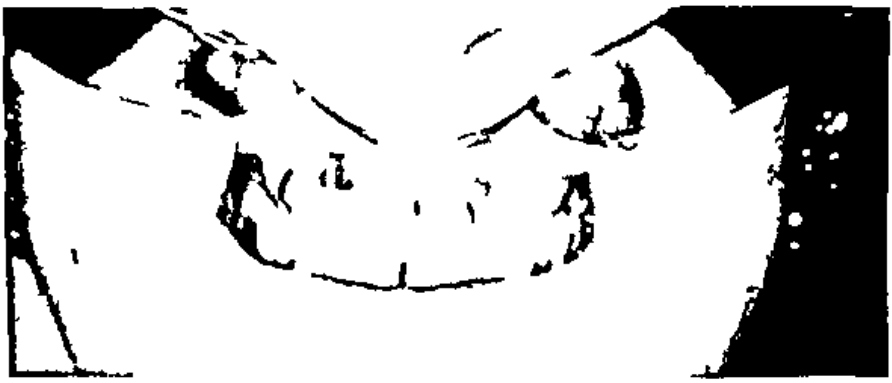
Past history revealed that the diagnosis of Addison s disease had been suspected and later confirmed in September 1953 at the William Beaumont Army Hospital Fort Bliss Tex where the patient was admitted in a comatose state It was this profound shocklike state of the patient and the marked pigmentation of her skin and mucous membranes that caused them to suspect this disease This was further supported by the response to treatment with normal saline infusions and lack of adrenal cortical stimulation with adrenocorticotropic hormone (Thorn test)

Upon recovery from the initial coma the patient stated that a bilateral salpingectomy had been performed at the age of 22 and that the pathologic diagnosis on the surgical specimen was "tuberculous salpingitis with peritonitis" During the time between that surgical procedure and the initial episode of coma no other signs or symptoms of tuberculosis were noted A roentgenogram of the chest at the time of [illegible] coma did not reveal any evidence of active disease

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From U S. Air Force Hospital Lake Charles Air Force Base La. Dr. Lewis is assistant oral surgery at 442 South Ryan Street Lake Charles La.

Aft r the diagno s of Addison d sease had been made th patient had been placed on gr ded daily oral doses of cortisone the dosage finally b ng regulated to 12 ½ to 25 mg daily Th patient seemed to do very w ll on th s except during periods of mental or physical stre s t which t mes it became n cessary to add extra salt to her diet



F gur 1 P gment t f th lab l m co f th p or max ll



F gur 2 P gmentat f th g g l m co a f th mand bl

Two more episodes of coma one in October 1954 and an ther in Jun 1955 are rec rd d between the initial pi ode and admission to this hospital on 4 October 1956 For sever l days prior to the Oct b r 1956 admis i n to this hosp tal for o al surgery the p tient noted occ sion l pain with associated soreness i the region of the left m ndible

Phy cal e am nat on on admiss on to the hospit l re ealed a well developed well nour hed whit w m n There w s n marked asym met y f her face a d jaws Her sk was a bronze to brown col There w s no e idence of erupt ns scaling subcutaneou nod l r telangiectasis H r eyes ears n and throat appeared be ign There was no significant lymph d nopathy Intra oral exam n t on e e led marked pigmentat on about the m rgins a well as the labi l nd b l urf ce of the gingiv l mucos both s periorly a d in f o ly (f g 1 d 2) The teeth ppeared to be in satisfactory rep ir cept f h mand bul left sec nd a d th rd molars which con t d car l abo t th co n l surfaces P in was definit ly

present on percussion of the mandibular left second molar tooth I also was found to be slightly mobile and elevated. Removal of the left second mandibular tooth was believed to be indicated

The patient was hospitalized for four days prior to scheduled surgical procedure During this time she received antibiotic therapy and a step-up in oral cortisone dosage to 75 mg daily On 8 October at 1030 hours under preoperative medication of 100 mg of Demerol hydrochloride (brand of meperidine hydrochloride) the patient was taken to the operating room While being moved from the stretcher to the operating table the patient vomited a large amount of yellowish fluid This resulted in some degree of weakness inasmuch as the patient was in a fasting state prior to premedication plus the fact that the morning dose of cortisone and a significant quantity of electrolytes were presumably lost in the emesis

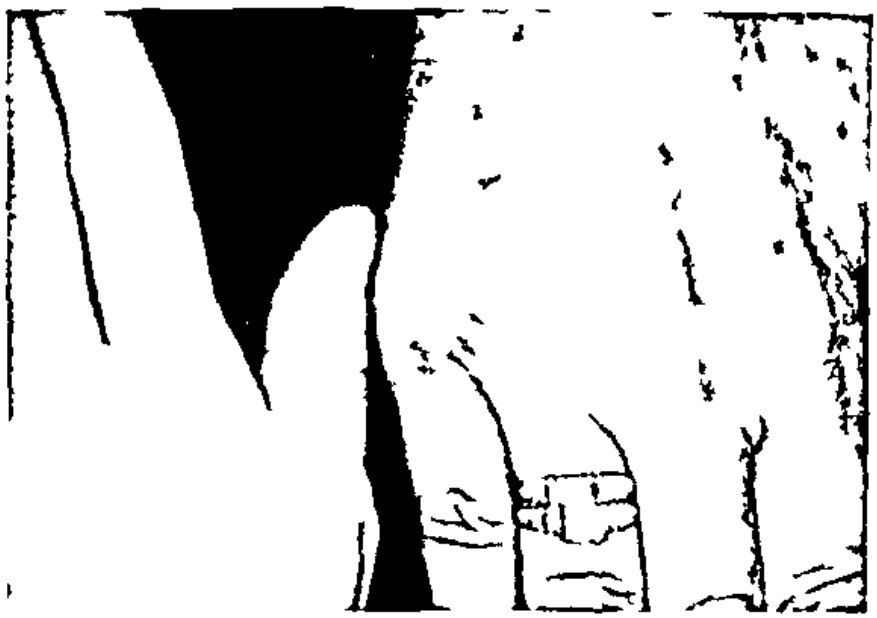


Figure 3 Operative site on seventh postoperative day

Initial blood pressure on admission to the hospital was 110/70 mm Hg The blood pressure recorded upon entering the operating room was 100/60 mm Hg At this point an infusion containing 1 000 ml of 5 per cent dextrose in normal saline solution to which had been added 30 ml of aqueous adrenal cortical extract was started This was allowed to drip at the rate of 30 to 40 drops per minute Under observation of an internist the patient was prepared for surgery Blood pressure recordings were made at 3 to 4 minute intervals and found to be stable at 100 mm Hg systolic and 60 diastolic A left mandibular block was performed using 2 per cent xylocaine hydrochloride (brand of lidocaine hydrochloride) with epinephrine 1/100 000 About 4 minutes following the injection of 1 ml of the local anesthesia the patient complained of rapid beating of the heart and associated palpitations of the chest All manipulations ceased Blood pressure was [illegible]

at 75 mm Hg systol c and 50 diastolic The pulse rate was 100 per minute equal nd regular

One hundred milligrams of Solu Cortef (brand of hydrocortisone sodium succinate) was incorporated nto the intravenous fluids and the infusion allowed to run freely Blood pressure was again recorded at 60 mm Hg systolic and 40 di stolic Blood pressure was then re corded at 30 second intervals and over a period of 4 to 5 minutes it gr dually rose to the preoper tive level of 100/70 mm Hg Concurrently the patient stated that she was gre tly mproved symptom tically and the o al surgeon was allowed to continue Under local anesthesia the mandibular left s cond mol r was extracted by me ns of forceps without diff culty



F gure 4 P t t h d o th ght mp d w th th hand f a erag whit woman.

Over the next 24 hour period only sl ght bleed ng from the operative site wa observed and the patient was allowed to continue her usual m thod of steroid maintenance Forty eight hours followi g the pro cedure she was discharged to her home Figure 3 shows the operative s t on the seventh postoperative day Appearance of the patient s h nd is hown in figure 4

COMMENT

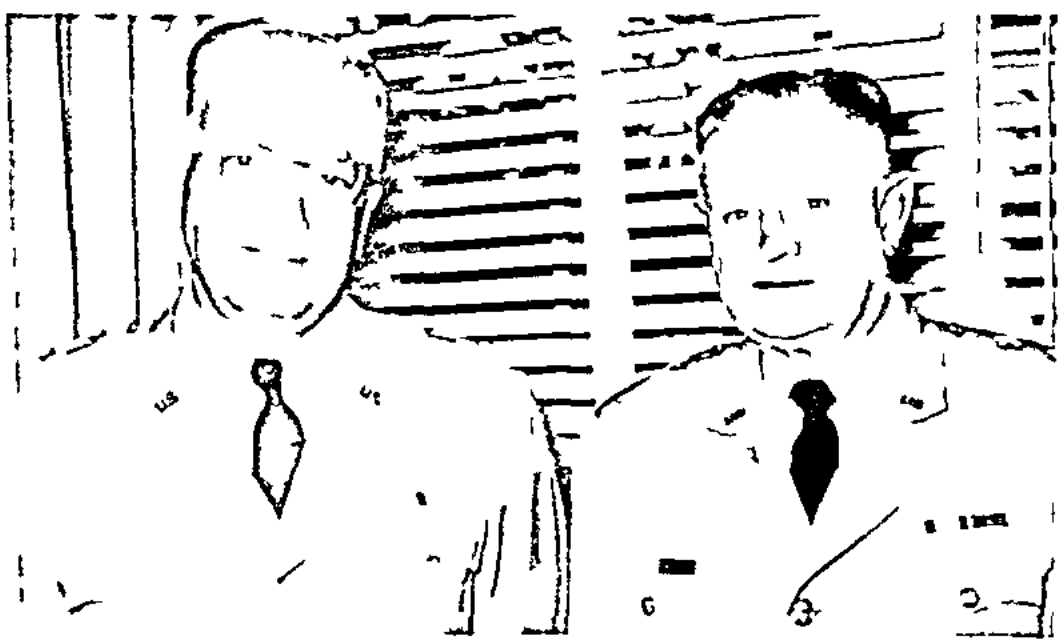
In this case the cause was believed to be tuberculosis on the basis of patholo_ic diagnosis at the time of gynecologic surgery The importance of preoperative steroid preparation preferably by the parental route is obvious The oral surgeon does not encounter this situation too often fortunately However when it does occur the comb ned management of the patient by the oral urg on and physician is recommended

GEN HEATON NEW ARMY SG GEN GORBY TO COMMAND WRAMC, GEN COONEY TO URAREUR

Major General Leonard D Heaton commanding general of Walter Reed Army Medical Center since 1953 succeeded Major General Silas B Hays as surgeon general of the Army on 1 June

General Heaton is a distinguished military surgeon In June 1956 he operated on President Eisenhower and in November 1956 and Feb ruary 1959 on former Secretary of State John Foster Dulles He is a fellow of the American College of Surgeons and a member of the American Surgical Association He has been certified by the American Board of Surgery since 1948 He was the tenth commander of Walter Reed Army Medical Center which includes Walter Reed Army Hospital Walter Reed Army Institute of Research and the Army Central Dental Laboratory and Prosthetics Research Laboratory

Born in Parkersburg W Va General Heaton received his medical degree from the University of Louisville Ky in 1926 He received his commission as a first lieutenant in the Regular Army in 1927 after serving an internship at Letterman Army Hospital San Francisco He graduated from the Army Medical School and Medical Field Service School in 1929 and is a graduate of the Command and General Staff



Majo General Leonard D Heaton Su g on General of the Army left and his p edecessor Major Gen al Silas B Hays

School When Pearl Harbor was tracked in December 1941 Ge eral Heaton was chief of surgical service at North Sector General Hospital Schof eld Barracks Hawa In 1942 he was transferred to Wo drow Wilson Hospital St unton V and was later given command of the 160th General Hospital which he took to Europe in March 1944 At the end of the war Gener l Heaton headed the 802d Hospital Cente in Blandford England He served uccessively as chief of surgical services d rector of p of sional ervices and commanding gener l of Letterman Army Hospital between 1945 and 1953 His military decor tions nclude the D tinguished Serv ce Medal nd the Legion of Merit with second o k leaf cluste



M jo Gener l Jam P Coo y MC USA b / ge U S A my Europ



M jor Gene al Al L. G by MC USA comm nd g g l Walt R d A my M d al Cent

General He t n s success r at Walter Reed Medical Center is Major General Alv n L Gorby ch ef surgeon of U S Army Europe G neral Gorby is a native of Spencer W Va and r ceived his medical degree t the Un vers ty of Okl h ma in 1925 He was comm ssioned as a first l uten nt in the Regul r Army in 1928 after interning at Letter m n Army Hosp tal He graduated from the Army Medical School and th Medical Field Serv ce School in 1927 nd from the Command d l St ff School in 1936

M j l J mes P C oney deputy surg on ge eral of the Army fo th p t v s the n w chief surgeon of the Army in Europe A n t f P ll I wa he c ved his medical degree in 1927 fr m th Un I w In 1929 h graduated from the Army Medic l School nd A m M d l F ld S rvic School He has ach eved

distinction as an authority in radiology and atomic medicine In 1946 he was assigned to the Manhattan Engineering District to train for the Bikini tests and participated in numerous radiological surveys After Bikini he was sent on a special mission to Japan to study the A bomb survivors at Hiroshima and Nagasaki Before becoming deputy surgeon general he served as commandant of the Medical Field Service School

General Hays surgeon general of the Army since 1955 is a native of St Paul Minn and received his medical degree from the University of Iowa in 1928 He was commissioned as a first lieutenant in the Regular Army in 1929 graduated from the Army Medical School and Medical Field Service School in 1931 and the Army Industrial College in 1940 He served two tours of duty in the supply division Office of the Surgeon General one as its chief as chief of medical supply in the European Theater of Operations as Surgeon U S Army Pacific and as surgeon of the Japan Logistical Command In 1951 he was recalled from Japan to become deputy surgeon general

The notable accomplishments of General Hays administration include the establishment of the Office for Dependents Medical Care (MEDICARE) on 7 December 1956 to provide medical care in civilian facilities for dependents of military personnel on active duty the organization of the Army Medical Research and Development Command and as part of the Army Medical Services gradual shift from hospital care to the treatment of more patients on an ambulatory or outpatient basis the establishment of the Army health record in 1957 to provide a comprehensive and continuing medical history of each individual on active duty Seven new hospitals were constructed and dedicated while General Hays was surgeon general He plans to retire next month

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RESEARCH GROUP ELECTS CAPT ENGLISH

Captain James A English DC USN head of the dental branches Office of Naval Research and Research Division Bureau of Medicine and Surgery was elected as vice president of the International Association for Dental Research during the group s recent meeting in San Francisco He has served in the Naval Dental Corps since 1937 when he received his degree in dentistry from the University of Pennsylvania



Captain English

He has served as science liaison officer Office of Naval Research London and is author or co-author of a number of published articles in the field of dental research

CAPT CHENAULT GEN KENNARD ELECTED OFFICERS OF AEROSPACE MEDICAL ASSN

The Aero Medic l Associ tion headed for the past year by Brig dier *General M S White USAF (MC) chang d its n me to the Aerospace* Med cal Association by vote of the members at the thirtieth annual meeting at the Statler Hilton Hotel Los Angeles 27 29 April. The association s monthly journal will here fter be known as *Aerospace Med cine*



D Pbo b



D R ff



Dr Lamb



D B kma

N vy nd Air Fo ce medical officers won the four awards named in memory of pioneer flight surgeons wh ch are given annually by the Assoc ation C ptain Cliffo d P Phoebus MC USN N val War College Newport R I rece ved the Theodore C Lyst r Award for out t nding achievement in the gene al f eld of aero pace m dic ne He was also ind ct d s the cha rman of the Space Medicin Branch f the Assoc ati The Raymond F Long cre Award w g ven C p- tain George E Ruff USAF (MC) Aero Medical L bo atory Wright Patters n Air Force Base Ohio for h s work in testing of Project Mercury candidates Lawrence E Lamb M. D head of the dep rtment of intern l med cine U S Air Force School of Avi tion Med cine wo the Arnold D T rtle Aw rd for h s exten ive contributions to avi tion card ology The Eric Liljencrantz Med l went to Captain Edw rd L Beckman MC USN now on duty at the Roy l Navy Institute of Aviation Medicin F rnborough England for his v luable research in the effects of acceler tion on man

Captain Oran W Chenault MC USN assistant ch ef of th Bureau of Medicine and Surgery fo av tion medicine was chosen f rst vice pre ident of the Association Major Gene al Oliver K Niess surgeon general of the Air Force was elected to the executi e council for a three ye r term and Brigadier General W lliam J Kennard USAF (MC) (Ret) Arlington Va was selected secret ry tr asurer Generals N s and Kennard and the followi g other Medical Corps officers w e elect d to fell w hip the society s highest grade of membership C l l H old V Ell ngson USAF Captain Ross B La tz he ser USN Capt F k k Sm th USN Captain John T Sm th USN nd Colonel John M T lbot USAF

ADMIRAL PUGH WRITES AUTOBIOGRAPHY

Rear Admiral H Lamont Pugh MC USN (Ret) Surgeon General of the Navy 1951 1955 has recently had his autobiography *Navy Surgeon* published by J B Lippincott and Company Philadelphia Pa Admiral Pugh who now lives in Virginia served his country in three wars as a Marine in World War I as a Naval surgeon and administrator during World War II and as Surgeon General of the Navy during the Korean conflict His autobiography gives an eye witness account of the progress of American society from the oxcart of his Virginia boyhood to the jet plane and the comparable progress in medicine from the use of maggots to control gangrene to penicillin antibiotics and modern medical and surgical methods



Admiral Pugh

A fellow of the American College of Surgeons since 1934 Admiral Pugh was the only member of the regular Navy who was certified by the American Board of Surgery when he was appointed as Chief of Surgical Services at the U S Naval Hospital Pearl Harbor in 1942 Eight months later he became Chief of Surgical Services at the U S Naval Hospital San Diego Calif then the largest Navy hospital in the United States

In 1944 Admiral Pugh became commanding officer of the U S Naval Medical School at Bethesda Md and two years later was appointed Assistant Chief of the Bureau of Medicine and Surgery and Deputy Surgeon General of the Navy

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AIR FORCE OUTSTANDING UNIT AWARD

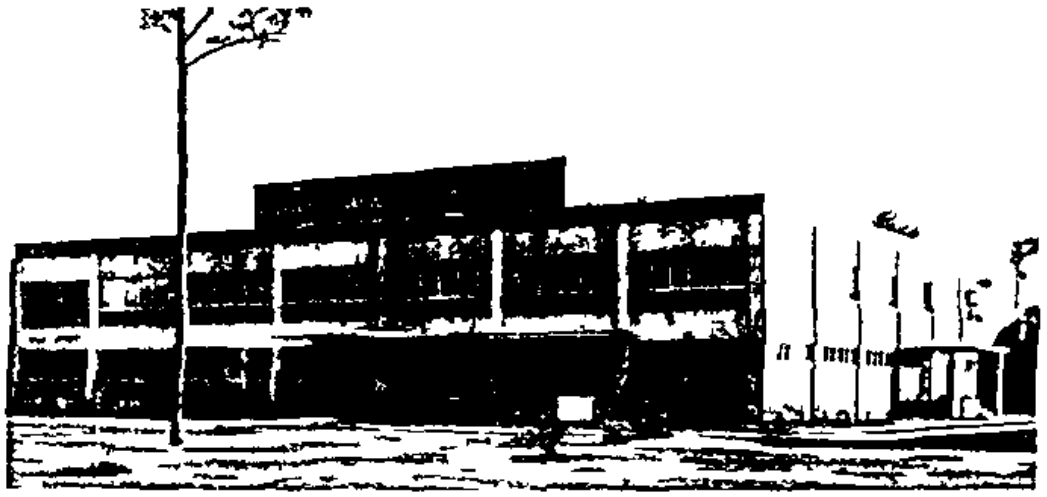
The First Aeromedical Transport Group (MATS) Brooks Air Force Base Tex recently received the Air Force Outstanding Unit Award for exceptionally meritorious service of national significance to humanity during the period 1 February 1953 to 31 December 1957 The only unit of its kind in the Air Force the group commanded by Colonel Luther B Matthews provides air transportation for patients of all branches of the Armed Forces within the United States During the five year period covered by this award the unit completed more than 210 000 patient movements and logged more than 200 000 flying hours without injury or loss of life by accident



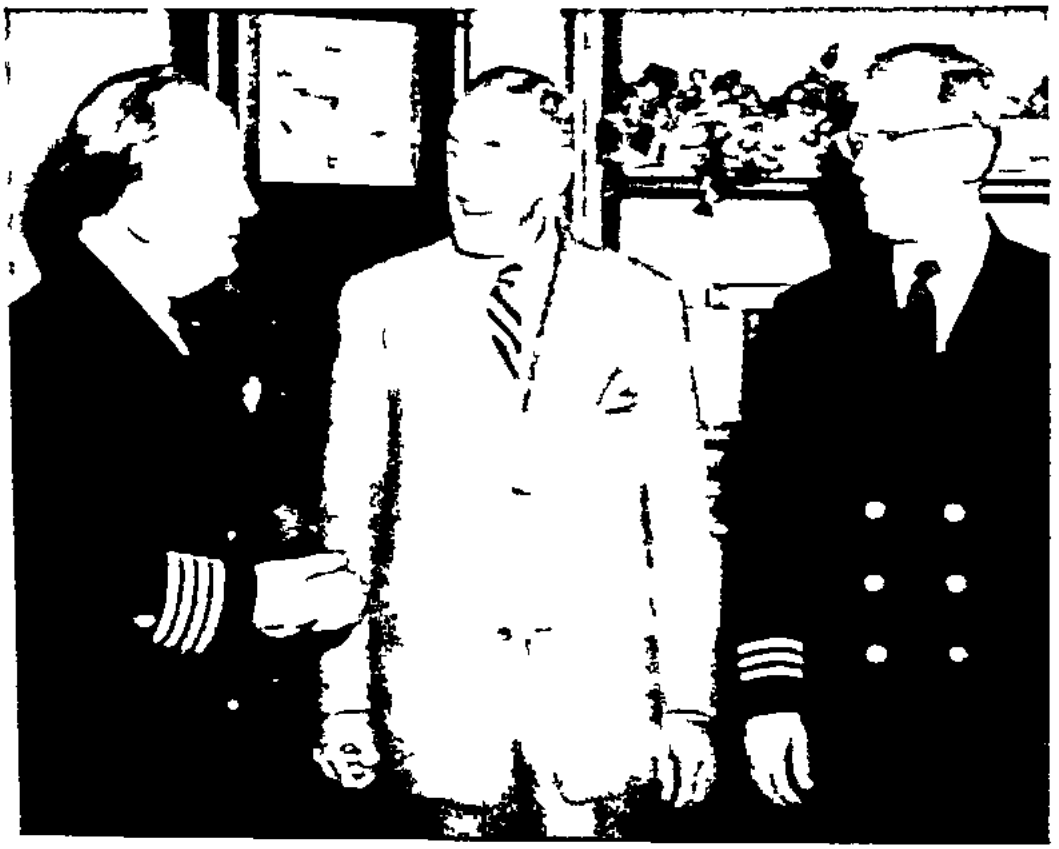


RETIRED Rear Admi al Irwin L V Norman MC USN left In pector Gener l of the Medical D p rtment Actı ities Bureau of Medic ne and Surgery retı d 1 May aft r mo e tha 31 years f ser e ın the Na y B g dier G neral Robert E Lee USAF (MC) forme surgeon of the Tactic l Aı Comm nd ret red ın Apr l aft r almo t 33 years a an Aı Force medic l ff r

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MYRTLE BEACH Th s two-story a r-conditı ned hosp tal offering m dical urg cal nd obstetric fac lit es for ınpat nt c re and cl n cs me n l med cine obst trics and surgery for outp tı nt service pe ed 1 M ch 1959 at Myrtle Beach Aır Force Base S C Colo l P ul E I c USAF (MC) ıs comma der of the new 50-bed f c l y

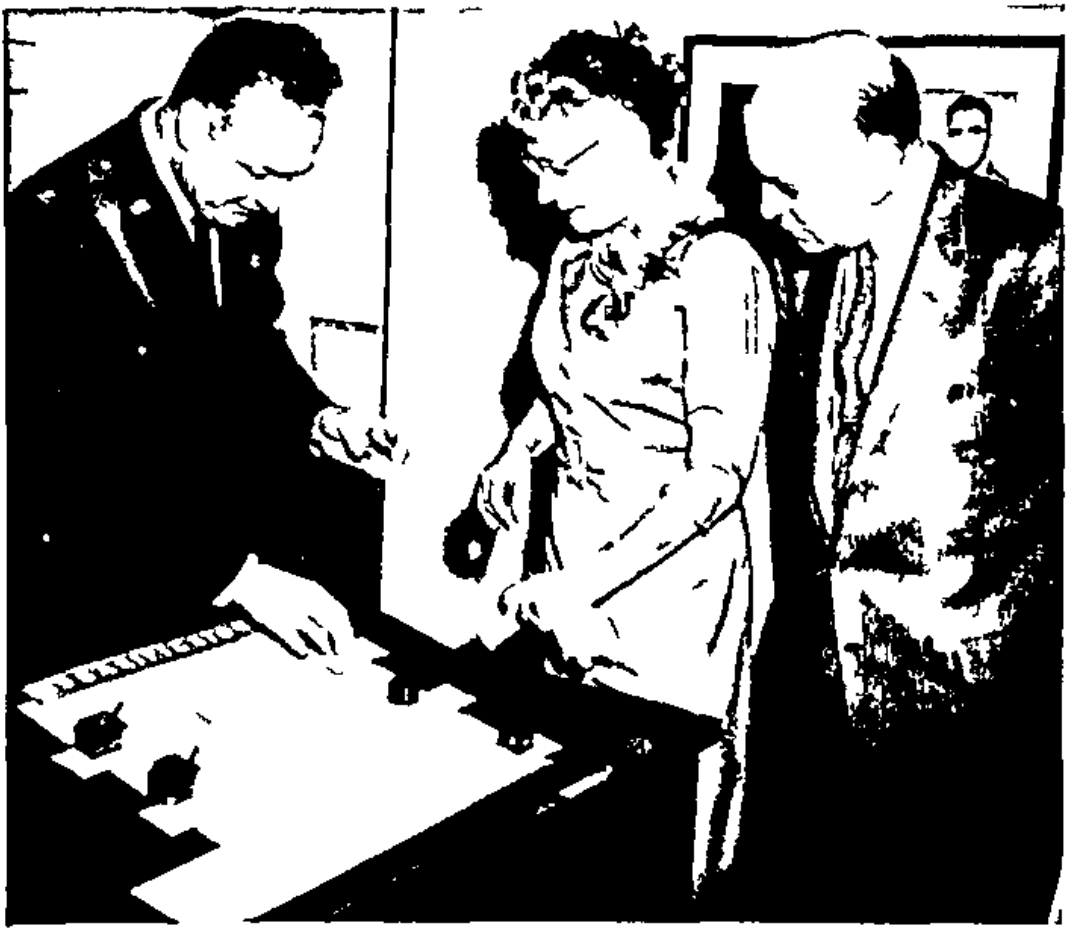


AUSTRALIAN VISITOR Dr Reginald Francis Masters chairman of the State Commission on of the Royal Australian College of Surgeons is greeted by Captain Frank P Kentz MC USN left commanding officer of the U S Naval Hospital Bethesda Md and Commander Thomas B Lebherz, MC USN head of the obstetrics and gynecology service During his recent visit Dr Masters observed the residency training program in obstetrics and gynecology at the hospital

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DR McGANITY ATTENDS BEIRUT MEETING

Dr William J McGanity professor of obstetrics and gynecology at Vanderbilt University School of Medicine and consultant to the Interdepartmental Committee on Nutrition for National Defense spoke on "Nutrition in Relation to Public Health" at the Ninth Middle East Medical Assembly held 8-10 May at the American University in Beirut Lebanon Officers of U S Naval Medical Research Unit Number 3 Cairo Egypt participating in the meeting included Commander Pooer E Fultz MC USN who discussed current research on treatment of Schistosomiasis and Brucellosis Lieutenant Commander Max E Mosgrave MC USN who monitored the scientific exhibit Treatment of Brucellosis with Furoxone" and Lieutenants Thomas G Akers and Joel L Freeman MSC USN who presented papers on "Poliomyelitis in Cairo Egypt U A R during 1958" and "Hemagglutination Studies with Schistosoma Haematobium Antigens" respectively



MEDICAL ANTIQUE When bloodletting was a cure-all of the times—a tonic for the healthy and a cure for the ailing—the small 16-blade instrument held by Colonel Frank M Townsend USAF (MC) was in common use Called a scarificator it was used to make the slight cuts in the skin necessary for this type of therapy which was frequently performed by barbers of the period during the 18th and early 19th centuries This scarificator was presented to the Medical Museum of the Armed Forces Institute of Pathology by Mr and Mrs B Woodruff Weaver right of Washington D C on behalf of their uncle Colonel Theodore Barnes USA (Ret) now living in Florida The items in front of Col Townsend are part of the display of antique scarificators at the Museum Col Townsend is deputy director of the Institute of Pathology

GENERAL BENSON GIVES ANDERS LECTURE

The 1959 Anders Lecture Man in Space—The Medical Problem was delivered before the Philadelphia College of Physicians on 1 April by Major General Otis O Benson USAF (MC) commandant of the U S Air Force School of Aviation Medicine Randolph Air Force Base Texas The annual lecture named in honor of Dr James M Anders a former president of the American College of Physicians

Progress Notes

Colonel Louis K Montell MC USA is course director of the annual James C Kimbrough Urological Semina at Brooke Army Hospital Fort Sam Houston Tex 2 4 November 1959 Those desiring to partic ipate should submit titles and 50-word abs racts to Col Mon ell at Brooke Army Hospital by August 15 Captain Thenton D Booz MC USN will retire from the Navy next month after 30 years of service as a flight surgeon and hospi al commander Colonel Arthur B Torrow USAF (MC) is modera or of the six h annual anesthesiology re view course at the U S Air Force Hospital at Lackland Air Force Base Tex where he is chief of anesthesiology 8 13 June Appearing on the instructors panel in addition to members of the hospital staff will be Drs John Abajian University of Vermont College of Medicine Charles R Allen and George W N Eggers University of Texas Medical Branch John W Winter and Robert C Peterson consultan s in ane thesiology to Lackland Air Force Hospital and Brooke Army Hospital Max S Sadove University of Illinois College of Medicine and Major Paul Teschan MC USA Brooke Army Medical Center Tex Captain Ashton Graybiel MC USN director of resea ch at the aval School of Aviation Medicien Pensacola Fla spoke on the role of diet in manag ing coronary heart disease at a symposium on nutritional problems in medicine sponsored by the American Medical Association s Council on Foods and Nutrition and Vanderbilt University in Nashville Tenn on May 8 Colonel Frank M Townsend USAF (MC) deputy director of the Armed Forces Institute of Pathology recently spoke on "Evaluation of Aeronautical Data in Accident Cases—Government Accident Inve ti gation Procedures Records Regulations Sources of Data at the University of Denver College of Law Denver Colo Lieutenant Colonel Nathan Cooper USAF (MSC) principal preceptor for the Air Force hospital administration training and residencie attended a meeting of the Association of University Programs in Hospital Admini stration in Pittsburgh Pa 7 9 May Papers were pre ented at the annual meeting of the Federation of American Societies for E x perimental Biology in Atlantic City N J by the following staff mem bers of the Armed Forces Institute of Pathology Drs Vaman S Warav dekar Arthur M Silverstein Hans F Smetana Richard H Follis Jr Lolla Iverson and Leo R Goldbaum Captain Dwight A Callagan and Lieutenant Charles A Novotny MC USN and Lieutenant William K Hass MC USNR U S Naval Hospital Portsmouth Va presented a paper on their studies using the electroencephalograph to detect fetal heart impulses at the recent annual meeting of the American Col lege of Obstetrics and Gynecology in Atlantic City N J Profes sor Jack Adams Ray chief of surgery at the Karolinska Hospital Stockholm Sweden and writer and re earch worker in the pathophysio logical approach to surgery spoke on "The Chromaffin Granule Cell System in Human Skin at an open lecture at the Naval Medical School, Bethesda Md during an April visit to the United State One hundred and twenty five military and civilian physicians attended a

We hav heard of f ont men n big business a d organ zations and know they pl ce their best foot forwa d when coming in contact with the people they serve Acco dingly c mmander of Army medical activities would do well to place their best peopl in these front l nes of medicine We know of course that many of our you g physicians have just come out of internship and residency nd to their l t f lls much of this front l ne medicine In order t achieve desirabl levels of p tient sat f ction our young physician need car f l guida ce by xperi nced med cal officers who und r t nd soldier psv hology nd the needs of their families In general these young physicians have do an outstanding job and will continue to do so But they may be dis ppointed in the rout e daily chore of eeing seemingly well people or pari ts who gr vitate tow rd th med cs when the going gets rough

At our large trai ing camps faced with a duous t aining schedules and b racks l fe w th l ttle tim f rec tion our young soldiers seek father and mother in our phys ci ns a d nurse and their ble ssi t nts Such h gh ound ng desc ptions like the n stling compl x will not s l e the problem of th hum n b i g who presents hims lf for med cal care at a d spens ry o clinic Somebody in the Army Medical S rvice cha n will have to see him as a patient examine h m pr scr be for h m if necessary o make a d cis on that h is f t f w rk—d ty—or train ng—what ver his as igned task S ldi rs ho ld not be tigmat z d with som tch all phra e or di gnostic waste b sket

All individuals in the m litary service have had contact with th r respective med cal service even if they never were sick Physical ex minat ons immunizations a d profiling are health er ices we must prov de them We do not mean to infer that we should nurture soldiers to our bosom Firmness with kindnes is in o der Under standi g and sympathy are not incompatible w th good med c ne

S ch gratu tous remarks to the soldiers or their dependents Oh you here again! or What s wrong w th you this t me? do not p mote *good hum n relation We hav heard of the medical off cer who njects* his personal experiences into patient compla nts—like the wife of the ervic man who complained of dizzy spells and the doctor replied So wh t I get dizzy too

We don t need to worry about the patie t who is admitted to the hosp tal for a gastric resect on a c ronary di ease he will g t the the b t profes nal care possible We are concerned with the hundreds of th u nd of patients who are see d ily in our clinic and dis p sari s l h e where the c rporat m ge personality of the med cal t arm t f c l ty establi hed

Thos of s wh w c mpl ts on m dical care are well aware that the majo ty f es we e handled sci nt fic lly correct—the

human relations aspect was neglected Whether we like it or not we who have elected to provide service as personal as medical care must keep our poise and dignity no matter what the provocation Once a complaint gets outside the dispensary or clinic everyone gets in the act sometimes from the White House on down

Perhaps we should welcome complaints because it is through them we can improve our services

If we recognize that our outpatient services and dispensaries are the front lines of military medicine in peacetime then we are certain that commanders of our treatment facilities will place their first team there In fact we believe a commander or director of the medical activity will want to spend a lot of his own efforts in this area

Aside from the payoff in good relations that a well run outpatient clinic will give us there are benefits in the way of better training for our physicians nurses corpsmen and others who make the initial contact with patients Physical appearance layout adequate waiting rooms parking space and personalized approach—all will contribute to the improvement of our Medical Program

We can think of no better place to start in making our medical facilities the most attractive in the community professionally and physically than in the outpatient area

INCREASED INCIDENCE OF SMALLPOX BRINGS WARNING

The following statement by the surgeons general of the military departments is directed to all medical personnel

The increasing incidence of smallpox in various parts of the world is a matter of considerable concern Not only is there more of the disease in the areas where it has never been stamped out but outbreaks are occurring in areas which have been free of the disease for years Smallpox has recently appeared in such widely dispersed areas as Liverpool Heidelberg Singapore and Omura Japan

Medical officers throughout the world should consider the possibility of smallpox whenever they encounter unusual skin lesions purpuras and fevers not otherwise explained Careful attention should be paid to the technics of vaccinations and to the interpretation of results

This disease with a case fatality ratio of up to thirty per cent has never been conquered and it must be fought vigorously at all times

A Message From the A M A

Man in his restless conquest of new frontiers has made significant progress in the exploration of outer space Advances in the design of rocket engines improved fuel for propulsion effective inertial guidance systems better aeronautical design of vehicles and a number of technologic achievements have been used to make space exploration a reality today

At first thought free flight orbital or satellite journeys are the principal concern of the engineer the physicist the astronomer, and the astrophysicist These groups working together with the electronic engineers have done much to put vehicles in flight and in orbit and to succeed in sending back to earth valuable information as to the scientific and physical knowledge of space Using telemetric devices data have been gathered concerning velocity of flight of the vehicle density and composition of outer space temperatures, magnetic and electronic fields gravitational influences and radiation effects of the various layers of outer space Animals have been included as a part of the pay load of some space vehicles and the first attempts at biological studies begun Recordings of the physiologic effects of space travel on animals have been flashed back to earth

The American Medical Association aware of the developments in the fields of space in 1958 created an ad hoc committee on aeronautics and space to follow the developments in these fields with special reference to the evolution of government agencies and legislation affecting them and to report to the Board of Trustees medical problems concerned Since that time on 29 July 1958 the President signed a bill now known as Public Law 85 568 creating the National Aeronautics and Space Administration that would have an over all supervisory function in the fields of aeronautics and space In broad terms this agency would (1) plan direct and conduct aeronautical and space activities (2) arrange for participation by the scientific community in planning scientific measurements and observations to be made through use of aeronautical and space vehicles and conduct or arrange for the conduct of such measurements and observations and (3) provide for the widest practicable and appropriate dissemination of information concerning its activities and the results thereof

Outer space is generally considered to be that vast area extending from 50 miles from the earth s surface to infinity and include the larger heavenly bodies and planets stars comets meteors d fine meteoric dust and other particles Higl altitude

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F m h I N I D f f h Am M d I A tan Th w d r p d ar ar ly b f h D partm t f D f —*Editor*

exploration has revealed zones of intense radiation, the so called Van Allen belt, that offers serious radiation hazards to space travelers It has been necessary to revise the estimates of radiation upward as the result of findings from some of the recent space probes Research that will lead to the eventual placing of man in space is underway

There are still a number of highly complex problems that must be solved before a successful manned flight into space and a safe return to earth is accomplished Tremendous forces are needed to place a vehicle in space A velocity of 16,560 miles per hour is required to attain an orbit about the earth To reach the moon, an escape speed of 25 200 miles per hour must be achieved It is readily apparent that speeds of this magnitude place great stress on animals or human beings, and necessary precautions must be taken for the safety of passengers during flight Upon return to the earth, it will be necessary to slow the vehicle down to a reasonably slow speed for a safe landing Proper protection of personnel during these periods of acceleration and deceleration is under intensive study by a number of agencies

Sufficient progress has been made so that the actual construction of a cabin in which a human being could make a space flight has been undertaken The problems of a person confined to a small space are not new ones, and many of the experiences gained in submarine work have furnished the starting place for the space cabin studies Limitations of weight and cubical contents pose troublesome problems in attempting to solve the difficulties of maintaining proper temperature, humidity, and avoiding auroral cosmic, and radiation hazards Significant advances have been made in the control of respiratory, excretory, and nutritional needs of the space traveler, though much still remains to be done Attempts to study weightlessness and its effects on animals and human beings have been made for brief periods Spacial orientation is under scrutiny by a number of research workers and influences of a new environment on this problem also are being reviewed Psychologic attitudes and the effects of travel in a small closed container for a long period of time have been subjected to rigorous experimentation Changes in chemical reactions in outer space and the influence of radiation effects are still vague but receiving attention of those in this field

Suggested methods of testing applicants for space travel will probably entail a series of complex tests Mock up space chambers have been used trials of weightlessness explored, although for very short periods and psychologic profiling, physical examinations and other tests are being explored The second International Symposium on the Physics and Medicine of the Atmosphere and Space, held at San Antonio, Texas, 10 12 November 1958 was an unusual review of the many advances made and complex problems of space medicine that are still unsol

even greater number of scientists met last month in Los Angeles California, to hear more than 150 papers in this fascinating field at the 30th annual meeting of the Aero Medical Association which in keeping with the times changed its name to the Aero space Medical Association

Industrial hazards in using highly flammable propulsion fuels launching of vehicles and handling of the complex and intricate mechanisms of space ships follow fairly closely the accepted practices of industrial medicine

While aeronautics and space is still a new field, there are many problems of a medical nature The American Medical Association through its special committee and through other departments, will endeavor to keep abreast of developments in this new and intriguing field Applications of these studies to the military are apparent and it will be a matter of time until the benefits to civilian life such as long range weather predictions and improved world wide communications are realized

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UNIVERSITY OF MINNESOTA HONORS COL LAY

Colonel Fr nce I Lay Chief of the U S Air Force Nurse Corps recei ed an Outstanding Ach evement Award from the University of Minnesota during the 50th ann versary celebration of its Scho l of Nurs ng 7 M y Colonel Lay received her b che lor s degree in nur g educat on at the U e s ty of M nnesota in 1951



C l l Lay

Enter ng th milit ry s rvic in 1939 as a graduate of the Gener l Hosp tal School of Nursing in Greenville S C Colo el Lay served as chief nurse at Randolph Air Forc B se and th 160th General Hospital in Europe during World War II

In 1951 a ch ef nur e at the Gunter A r Force Base Branch of th U S Air Force School of Avi tio Medicine she directed the training of newly c mm o d Air F rce nurses and flight nurses She served as a flight ur Ko e during the Korean conflict

CORRESPONDENCE

HOSPITALIZATION IN INFECTIOUS MONONUCLEOSIS

To the Editor The article "Rupture of the Spleen in Infectious Mononucleosis" which appeared in the January 1959 issue of the *U S Armed Forces Medical Journal* ended with this sentence "The question of hospitalization in infectious mononucleosis because of the danger of splenic rupture is raised

This question can be resolved for medical officers in the Armed Forces Since military personnel may be expected to be physically active they *should* be hospitalized whenever a diagnosis of mononucleosis is made because splenic rupture may be precipitated by trauma and even by physical exertion Furthermore if splenic rupture occurs while the patient is hospitalized a fatality may be averted

Almost all patients with mononucleosis are febrile and sick enough to warrant excuse from duty In some instances a "quarters" status may be more practical than hospitalization Even in such instances it might be advisable to hospitalize the patient between the tenth and twenty first day after onset of illness because splenic rupture usually occurs during this period (if the onset of mononucleosis has been reliably determined)

The incidence of mononucleosis is not so great that it is not feasible or practicable to hospitalize all patients with the disease" It is feasible I have been hospitalizing all military personnel with this disease for over a decade and the spleen of one of my patients ruptured during hospitalization

ROBERT J HOAGLAND Col MC USA
Martin Army Hospital
Fort Benning Ga

Colonel Hoagland's letter was referred to the authors of the article whose reply follows

We fully agree with Colonel Hoagland's comments as they apply to military personnel Our statement regarding the feasibility of hospitalizing all patients with infectious mononucleosis applied chiefly to the practice of medicine in civilian life

JAMES CARLILE Capt USAF (MC)
JAMES H CINTRY Capt USAF (MC)
USAF Hospital
Lowry Air Force Base Colo

Book Reviews

THE YEAR BOOK OF DRUG THERAPY (1958 1959 Y B k S) d t d by *H rry B km* M D 569 p g Th Y B k P bl h In Ch g Ill 1959 P $7 50

The lat st d tion of th well known c llection of abstr cts is like ts predeces or effect ely tr nged and presented It l rger than last year s dition a new ction on bronchopulmo ary diseases ha bee add d a d th ection on infectiou di ease has been signi ficantly ncre sed in ze The 22 major sections contain 493 ab stracts f om 23 count s d 108 jou nals The abstracts are brief nd re dable y t f ithf l to the g n l articles E ch ab tract i cludes the uthor s name and th t of the facility in wh ch the work w s done the journ l reference itself is given s a footnot The incl ion f black nd white g phs ch t and photograph dds g eatly to th b ok s v lue s do th xcell nt uthor and ubj ct inde es This book will pro e valuabl to n rly all phys c n nd especially to the gener l pr ctiti ner a d th internist It h uld be i cluded in the lib a y of y h spit l —*RICHARD L. SEDAM Lt MSC USN*

THE HAND It A t my d D by *J h J By* M D 384 p g ll d Cha l C Th m P bl h Sp gf ld Ill 1959 P $16 50

The th r attempting to w it a ew text on the hand is lway at d dva t ge because of th exc llent c verage of the subject lr dy l bl This is esp cially t u n v w of the p pular ty of the edit ns of Bunnell s *S g ry of the H nd* The present volume rou hly p r llels i outline the latte wo k and from it and others the uth r appar ntly has bo rowed freely The cover ge given v rious ubj cts s clear nd the organization is good The book is divided into five parts tructure nd devel pment infections t auma dise ses d reconstruction Th r commend tions f r tre tme t follow along well est bl hed lines The chief appeal of this volume is the g od organization and present tion of essential detail in a concise m n r —*JOSEPH R CONNELLY Capt MC USN*

POLIOMYELITIS P p d D on P ted t th F urth In t on l P l my l Conf mp l d d ed t d f h In t on l P l my l t Cong 684 p g ll d J B L pp C mpany Ph lad lph P 1958 P $7 50

This book is ut t nding example of the role poliomyelitis has played as a b llwether in le ding us to th broad knowledge of irol gy Over half of the d scu si n re de oted to b sic tud e i th tiol gic g t ot nly of pol omy l t b t of also related viruses a d th ence f ir l gy in general The rem nder of the book s de f om th eport f the n ti n l deleg tes is devoted to new wo k n th of p tients r habilit tion nd in the soci l as pect of th H gain a gre t d al of b c search s

presented to back up the findings of the clinicians The developments in knowledge of physiology and pathology reported are of importance beyond the limits of poliomyelitis The striking contrast between the report of the First International Conference in 1949 and the fourth in 1957 shows very well the phenomenal growth of the stature of the various disciplines represented The book is also full of hope for the future for the patients now under care for those who may acquire this disease later and for the many in whom the disease will be prevented by the developments which take place faster than they can be reported It is recommended reading for all who are concerned with any of the aspects of poliomyelitis and for all who are involved in multifaceted co-operative endeavors —JOSEPH W COOCH Lt Col MC USA

VIRAL AND RICKETTSIAL INFECTIONS OF MAN ed ed by *Thomas M Rivers* M D and *Frank L Horsfall Jr* M D 3rd edition 967 pages illustrated J B Lippincott Company Philadelphia Pa 1959 Price $8 50

The extensive revisions incorporated into the third edition of this excellent volume make it essentially a new book Commensurate with the advances in knowledge of the past six years it is larger than its predecessors but it has been kept to a size reasonable to meet the needs of graduate students in the biological sciences and medicine A natural dichotomy exists within the volume The first eleven chapters might well stand alone as a formulation of the science of virology without particular attention to the purely medical aspects of the discipline Here may be found detailed discussions of the chemical and physical properties of viruses biochemistry of the virus infected cell and virus host cell relationships There is nothing intuitive about this material It is difficult and is presented without concession but it is to the credit of both the individual authors and the editors that the chapters are uniformly lucid and understandable to the nonspecialist who is willing to give them the application their scholarship merits The remainder of the book is concerned with the various viral and rickettsial diseases of man and the orientation is distinctly clinical Here is a distillate of experience and common sense that makes the volume outstanding There are excellent chapters on the Echo and adenoviruses (groups discovered following the appearance of the second edition) poliomyelitis the Coxsackie virus group and the viral encephalitides My only objection to this volume pertains to the system of references which is similar to that in the companion volume on *Bacterial and Mycotic Infections of Man* edited by Dr René J Dubos The reader is referred to the second section of the book for references cited in the text but not included in the bibliography of the present edition With due respect for the excellent chapter "Principles and Methods of Epidemiology by D Kenneth F Maxcy it is essentially a shortened version of material presented in the Dubos volume The pages devoted to this chapter could have been utilized to better advantage in making the bibliography complete Most persons will undoubtedly consider *Bacterial and Mycotic Infections of Man* and *Viral and Rickettsial Infections of Man* an inseparable set and thus will not lose the benefit of Dr Maxcy's knowledge

HEMOPHILIC ARTHROPATHIES by *H y H J da* M D 255 p g ll t t d Ch l C Th m P bl h Sp gf ld Ill 1958 P i $8 50

Hemophili is a rel tively uncommon condition which is associated with a h gh incidence of orth pedic deformities and disabilities Arti cles appear frequently n the l terature concerning the diagnostic and medical aspects of th s di ease but there is pauc ty of references in the lite ture to th unde lyi g b s c tr atment and rehab litation of patients with hem phil c arthropathies This book fulfills a long standing basic need fo a re dy reference to the principles of orthopedic treatment and rehab l t tion of these patients It does not co er the finit poi ts of diffe ent l di g osis and the medical man gement of hemophilia Th uthor presents in detail the essential elements of x ay technic int rpretat on of x r ys and a completely rational and lucid appro ch to th t e tm nt of hemophilic arthropathies in cluding pr m ry m gem t the principles and technics of immobil izati n and the co ection of deformit s of major joints by vi idly illustrating the utilization of both ca ts and braces f r this purpose

Unquestionably the mo t ffective e ult of ther py of these p tients d formiti and disab l tie re accomplished utilizing a team appr ch to th p oblem ncluding physician physical therap st occup tional therapist pl st r t chn n b c shop mechanic nurs and soc al worker The m teri l p e ented in such det il as to act as a guide to the ne essary ordin ted function of a y te m of selected speciali t respon ible for the care of these patients All major points conc rning x r ys c sts b ces and the management of the p t ents are well ill strated by x ays diagr ms pictures and charts Detailed case histor s furnish vi id synopsis of 10 y ars of extensi e experie ce in th m n geme tof o er one hundred pat ents with hemoph l c arthrop thie With th book as a guide mor effec ti e m nageme t and h bil t ti n of th se severely disabled patients c n be rea nably expect d

—*LLOYD W TAYLOR C I MC USA*

SYSTEM OF OPHTHALMOLOGY V lum 1 Th Ey E l t d t d by S *Steu t D k Eld* G C V O M A LL D Ph D D Sc M D D M F R C S F R C S E F A C S F R A C S 843 p g llus d Th C V M by C mp y t L ui M 1958 P $27 50

Th s is th first volume cf a new *Sy tem of Opbthalmology* which will e entually replace the s ven volume *Textbook of Ophth lmology* for which Duke Elder is ju tly famous In the new system of 15 volumes the author w ll be a sisted by his colleagues at the Institute of Oph th lm logy i Lo don Presumably this will r sult in more rapid pub lication of th se e in o der that the older volumes one two and three wh h h e l g been out f print may be brought up to date nd m de l bl

This first l m w ll be w lcomed by all v su l sci ntists be c s th m l on vol t n of the ye has er been gathered

together before and because Sir Stewart has elected to write this volume himself This book in addition to being scientifically fasci nating is written in the delightful literary style in which he has no peers The book begins with the effect of light on living organisms then the evolution of the visual apparatus of invertebrate eyes the eyes of protochordates vertebrates cyclostomes fishes amphibians reptiles birds and mammals It then covers the function of the eyes of animals including reaction to and perception of light perception of color perception of form and the perception of space It closes with additional evolutionary data including a discussion of median eyes rudimentary eyes luminous organs and electric organs of fishes

This is an especially useful book for the investigator using animal eyes The anatomy histology refractive error and visual capability of the commonly used laboratory animals are included A particularly thoughtful touch is the inclusion of marginal illustrations of the vari ous animals under discussion It would be a rare individual who would recognize most of them by name alone The many illustrations both black and white and in color are of excellent quality The arrange ment of the material is logical and the index is adequate While this book is not required in the practice of clinical ophthalmology it will aid the clinician in giving a better background in eye development and function It is certainly a required volume for the research worker for medical libraries and serious students of ophthalmology

—*VICTOR A BYRNES B g Gen. USAF (MC)*

GLAUCOMA Tran actions of the Second Conference December 3 4 and 5 1956 Princeton N J edit d by *F ank W Newell* M D 245 page illust ated Sponsored by the Josi h Macy Jr Foundation New Yo k N Y 1958 Price $4 95

This volume is a record of the Transactions of the Second Confer ence on Glaucoma held on December 3 4 and 5 1956 at Princeton New Jersey and brilliantly edited by Frank W Newell M D

The main purpose of this book is to stimulate glaucoma research Other objectives are to give the historical background of mechanisms concerned with aqueous formation to present the glaucoma problem from the standpoint of how increased tension in the eye causes damage to vision and visual fields often to a degree causing blindness the mathematical formulation of aqueous dynamics and the technic of applanation tonometry The manner of presentation is informal with many questions and answers and long discussions by various author ities The list of those that participated in this conference is a list of who s who in the field of glaucoma In addition there were sever al distinguished foreign visitors The book is easy to read and well illustrated by pictures drawings graphs and tables The technic of applanation tonometry is excellently described and illustrated The bibliography is an outstanding bibliography on glaucoma This book is recommended for use by residents in ophthalmology opthalmologists and researchers in the field of glaucoma research

—*AUSTIN LOWREY J Col MC USA*

PRACTICAL DERMATOLOGY by G g M L w M D F A C P 2d ed on 363 p g ll t ted W B S und C mpany Ph lad lph P 1959 P $8

Th re has been a distinct effort to br ng the second edition of this text up to date without expand ng greatly ts over all size The number of plates has been nc e sed to 121 nd the illustrations to 555 A chapter dealing with introductory m terial about basic sciences in derm tology has been added Each disease entity is discus ed from the standpo nt of symptoms physical findings pathology prognosis and treatment in a very co ci e manner and supported by pert nent illus trat ons Little space is gi en to the anat my physiology and chemi stry of the skin as th s a e b yond the ntended scope of the book In the pref e of this edition a well a in the first Dr Lewis states th t his purpo is to des gn a text for medica st dents a pr ctic l gu de for g eral pr ctitio rs nd an a d in orientation for other pecialists He has ccompli hed his purpose most effectively and ha presented his subject m tter in st aightfo w rd l cid man r Th book is h ghly recommended for use by those for whom it was d signed and sho ld be among the sta dard reference volumes on the subj ct of de m tology in all m dic l librari

—JOHN W ALBRITTAIN C pt MC ap st nurs as to m of All e t and d

PRACTICAL BLOOD GROUPING by F St tt M D D S D d P H R t M D B S 331 p g ll d Ch Th m P bl h Sp gf ld Ill 1958 P $9

At first thi volume appears to be anoth r book on blood gr up in s much as a number of such books or manuals h e been publ recently After exploring the book howe e many th ngs n t only of g n r l and specific i terest but also of very p ctical value were found It wa th real z tion th t p inted out that the t tle of the book belies its contents Ce tainly ts true valu is in pr ctical blood group ing but th n there i m ch more mate ial in it of equal or greater im port ce It is not a text for the neophyte blood bank techn cian nor will t probably satisfy the dedic ted investigator in the field of immuno hematology It will be of extreme value to th t group of clinicians patho ogists hematologists and others who require more than the average int ll gence n this field The authors have divided their book into 14 ch pters plus an appendix containing sometim s hard to find us f l blood group frequencies Each chapter conta s references to tinent orig nal p blications The first two ch pters present material lati e to the factors in olved i d cell aggl t nation tests in t globulin or Coomb test and the causes and react a d s bsequent ones discuss the ABO blood tic l c d t on of their determi tion There are th Rh blood g p sy t m and the organization of an servic d hr chapter devoted to a thorough c oss m tch t blood grouping d ff culties in anemi and h t tif c t o of atyp l

summarizing briefly the various blood group systems other than the ABO and Rh and a brief review of the family and genes and other rare blood [illegible] developed in an interesting way [illegible] presented pertinent points are discussed and then the author [illegible] to technic interpretation and so on The reader may see at once what his approach to any one blood group problem should be and he may draw his own conclusions [illegible] very helpful feature is the inclusion of some 70 blood group charts If I happened to them it can certainly be great to have such charts to use as real problems and solutions to be remembered —JOHN HAMILTON AFFOLD Lt Col MSC USA

PRINCIPLES OF PERIPHERAL VASCULAR SURGERY by S Thomas Glasser M D C M F A C S F A C S Ed 410 pages illustrated W B Saunders Company Philadelphia Pa 1961 Price $12 50

In a thorough manner this volume covers the field of peripheral vascular surgery It is arranged in a logical and concise manner The chapters on sympathectomy and the venous system are particularly well done The rarer peripheral vascular diseases are lucidly discussed and treatment modalities well outlined This book will be of value to the busy surgeon for quick review of any phase of peripheral vascular surgery Surgical residents will find this volume of great interest because physiology as well as treatment is thoroughly discussed The extensive bibliography at the end of each chapter makes this an excellent reference book High recommendation for use in clinical work should be given to this volume —VICTOR C STRATTON Capt MC USN

MUIR S TEXT BOOK OF PATHOLOGY revised by D F Cappell C B E M D F R F P S M R C P F R S Ed 7th edition 1201 pages illustrated The Williams & Wilkins Company Baltimore Md 1958 Price $14 50

This is an excellent textbook of pathology for medical undergraduates It is very well known and widely read in the British Isles but unfortunately has not gained the popularity it deserves in this country Extensively revised since the last edition in 1951 this is an increase in the number of pages and about 100 more well selected illustrations of pathological specimens than in the first edition There is much material on the classification of tumors with ample discussion of the more common types both benign and malignant and lesser accounts of the rarer varieties which may present diagnostic problems The subject of hematology and its relationship with immunology is covered in some detail in this newest edition and this discussion is timely and up to date There is an entire section devoted to electrolytic balance and fluid due to its great importance in the clinical fields and an extensive discussion on the endocrine glands and their physiology as related to the pathologic changes If this text was as known in this country as in the British Isles it would be as fantastically received —JOHN F McCABE Capt MC USN

THE PRACTICE OF SANITATION by *Edw d S tt H pk* d *W lm H ry S h l* 3d d t F ew d by *Ab l W lman* 487 p g ll s- t t d Th W ll m & W lk C mp y B lt m Md 1958 P $8

The third edition of this book maintains the st ndards set by the f rst two edition In keeping with the rapid advanc s in environmental sanitation chapters on fo d sanitation milk and m lk p oducts publ c water suppl e urban sewage d sposal rural sewag disposal stream polluti hou si g air pollution and industrial sanitation have been completely revised o rewritten The volume co ers the various fac ts of the nv ronmental sanitation in a g neral nontechnical manner eas ly ass m lated by laj readers Deta led information on e ch feature is precluded by the wide coverage of subject matter in a s ngle volume Although the new edition reflects a genuine attempt to maintain a degree of completeness nd up to-datenes which is all too often lacking in works of th s type ce tain cover g s are lacking n t chnical accuracy and curr nt pr ct ces for ex mple the ch pter on insect control does not include the newer in cticides and there are in ccuracies con cerni d sease vecto s a d et ology How ver such minor discrepan cies are to be expected in volume co ering such a wide field of ubject matter Although t could hardly be cons de ed a technical referenc fo industri l physicians o sanitary eng neers t should fi d a wid f ld of readers in the te her the general student th nurs and the l yman —*HARVEY G TOUSIGNANT Lt C l USAF (MC)*

FRACTURE SURGERY T b k f C mm F tur by *H rry M l b* M D F A C S d *R b t Aust M l b* M D 470 p g ll t d P ul B H b I N w Y k N Y 1959 P $17 50

This s one of the be t nd most concise books on fr ctures that I have e countered The e are four sections to the text The first covers emerg ncy cas includi g splinting axial mal lignments epiphyse l injuries h aling of fractures Sudeck s synd ome reduction of fracture plaster of paris compound fractures and regio al anes thes a n f cture tr atment It presents the details of traction in a manner which is easy t comp ehend Compound fractures are dealt w th from i it al management wound debridement inf ct d wounds vascular nerv and te don injuries to the treatment of skin defects The chem try of pl ter of p ris is prob bly too detailed for practi cal purposes The second section covers fractures of the vertebr l c lumn and fractures of the thoracic c ge and is complete down to the technic of insertion of Barton o Cr tchfield tongs Th rema n ng two secti n deal regionally in g ner l manner with fractures of the upper e tremity nd th lower extrem ty respectiv ly For surgical det ls one would ha e to refer t m re complet work This book should be eadily avail bl to all interns urgical residents general p a t ti ers d to th se speci lly i ter sted n the tre tment of f cture The p inciple presented are ound and are acceptable to mo t auth t es th f ld of fr ctur m n gement

—*ROBERT H BROWN Cmdr MC USN*

J a 1959)

PHYSIOLOGY OF SPI AL
M D with a forew
F R C S E 195
Baltimore Md 195

This volume is a
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physiology and the alterations
ular emphasis on spinal
are discussed and prophylactic
The advantages of spinal
physiologic changes produce
peutic effects Warning is
may cause adverse effects
particularly interesting because
with pregnancy and the modifi
anesthesia The extensive bibliog
the vast amount of material
brief but adequate This book could
who administers spinal anesthe
training It will serve as a useful
hospitals —ROBERT E LAU

DISEASES OF LABOPATORY PRIMATE
with the editorial assistance
lustr ted W B Saunders

This outstanding book the fir t of a
and useful volume coveting
primates The author s term
primates from man and the lemurs
150 photographs charts and drawings
dietary and nutritional disea es
protozoa of the intestinal tract
diseases of abdomen and che t
nervous endocrine reproductive
and neoplasia Wherever possible
logic conditions into
subject matter chronologically
cidence symptomatology
and therapy Each chapter is
The volume was written not only for the
vestigators maintaining primate
existed for a clear and concise
recommended for anyone engaged in
for those interested in the care and
—HARRY A

DISEASES OF THE NERVOUS SYSTEM D b d fo P t t d
St d t by S F W l b M D D Sc F R S with h p
Th N ur l g l C mpl f L D d H p to-
l l Deg by J M W l b M. R C. P 9th d t
373 p g ll t t d The W ll m d W lk C mp y B lt m
Md 1958 P i $8

A book that has gone through nine successf l editions has obviously met the test of us fulness It is to be h ped and expected that this smoothly written and ea oned text w ll progres through many more editions Intended as a t xt nd r ference this book is well arranged a d indexed for re dy vailability of cl cal inform tion For those who desire to enrich th ir unde t nding of p rticular aspects of neur ology the lack of a bibl og aphy s a distinct weakness The candid and long ov rdu statem nt on tr um tic neurosis is refreshing as well as d turbingly ccurate The author show good judgment in not including the cha t c and presently speculative new material in neurochemistry and neurophysiology but he would have done well to mention such work —*PAUL F EGGERTSEN Lt C I USAF (MC)*

BEHAVIORAL ANALYSIS A ly f Cl l Ob ti n f B h
A Appl d to M h N wb R l t h p by D d M. L y M D
370 p g Ch l C Th m P bl h r Sp gf ld Ill 1958 P ic
$9 50

This study beg n with an ttempt to find a better w y of determining the presence of n attitude th n through a p ll of opinions The obser vations which we e cr ned fo the presence of ttitude were limited to small segments of the beh vi r of a rel tiv ly small number of people in a pecial situ tion This author c llected and compiled a tremendous amount f mate l b sed on observation of the behavior of 19 mothers with th ir newbo n babies These mothers were obser ed in a hospital on two o thr occ sions starting the moment the baby was brought by the nur e nd nding when the baby was t ken aw y The records were listed for ch case in appropriate units and numbers These units were then v ew d by four judges individually for gradation of positive to neg tive feel ng toward the baby In addition the mothers were interviewed through use of a sta dard zed question ire and sco ed to determine r tings ranging from h ghly m ternal to non maternal Numerical rat gs we e giv n to these rat ngs Comparison of the judges rati g and the rat ngs n the quest onaire revealed a urprising degr e of posit ve correlat on Th chapters are written in s ch a w y that th r ader can share the author s trials and pre d c ments in collecting nd ev lu ting the data Th application f this method in th t dy f othe fo m of rel ti n l behavior is con sidered The methods ed in this study can nd have been applied gener lly to th tudy f relatio al beh v r for ex mple to the study of m the s and their schizophrenic ch ldren dur g v siting hours or in chizoph n c mothers and their ch ldren Th s study hould a d nd t ding th p bl ms in ol d n the derivation of attitudes f m beh o m fest d n othe s c al lat onsh ps

—*STEPHEN MOURAT Lt C I MC USA*

[illegible]

This short book [illegible] a method of instruction of radiologists in the study and treatment of the emotional life of the child. It is [illegible] a communication clinic has been established and the services of the New York City Department of Health under the direct name of "Emotional Health Service." The material is followed by a series of case presentations from the records. Significant [illegible] sequence with a great deal of material suggested to the reader [illegible] this is an interesting but not very practical book, [illegible] for use by those professionally engaged in [illegible] residents and by radiologists and those engaged in the [illegible] field.—J. MCF. DOW, M.D., L.R.C.P., M.C., D.P.H.

SURFACE AND RADIOLOGICAL ANATOMY. By [illegible] practitioners. Edited by A. E. Barclay, M.D., F.R.C.P., F.R.C.S., and I. de C. Calvert, M.D., D.Sc., F.R.S.E., and G. Simon, M.D., B.Ch., D.M.R.E. (Oxford), F.F.R. 345 pages. Illustrated. The Williams & Wilkins Co., Baltimore, Md. 1950. Price $7.50.

In the first revision of this book since 1940 the authors have altered the relationships between anatomic surface structures and their relationships to the underlying body structures as viewed by roentgenography and dissection. This approach to "living anatomy" is well illustrated by numerous accurately illustrated and labeled drawings and roentgenographs. The correlation between the universally used methods of physical examination and the anatomic basis for physical findings is emphasized. Individual normal anatomic variations are discussed in regard to each system. Detailed descriptions of technics of all types of examinations are confined to the introductory chapter. In separate chapters this book combines the detailed anatomy of the human body by *anatomic regions*. *Visible external landmarks*, the physical findings related to them and the use of radiographic examination in each of the areas considered is discussed in relation to the detailed anatomy of the area as seen at dissection. In addition to the excellent reproduction of radiographs, the illustrations of the uses of air and opaque contrast media in radiography are of the highest quality. This book contains excellent demonstrations of the radiographic anatomy of the lungs by bronchography. Other contrast studies of the heart and cerebral vessels are included and almost every use of contrast material in the *radiographic* study of human anatomy is demonstrated. This volume is recommended as a basic supplement to standard textbooks of *anatomy*. It would be of major interest to all students of anatomy and would serve as a very good basis of reference in the field of normal *radiographic* anatomy. The easily understandable text and the excellent illustrations could also be used by anatomists and physicians who train technicians in the medical sciences.

—EDWARD A. SHELDON, [illegible] SAF (MC)

ORTHOPAEDICS IN GENERAL PRACTICE I It Rh mat m D t ? By W H G rv M. A M B B Ch Ca t b F R C S 120 p g Ch l C Th m P bl h Spr gf ld Ill. 1959 P $3

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JUL 6 1959
WASHINGTON

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THE PRINTING OF THIS PUBLICATION HAS BEEN APPROVED BY
THE DIRECTOR OF THE BUREAU OF THE BUDGET 10 FEB 1959

Monthly Message

On Christmas Day 1958 an editorial entitled War Against Disease appeared in the *Washington Post and Times Herald* Aid in the form of public health preventive medicine and veter inary measures are only part of a medical aid program important though they may be There are three other directions for medical aid that should not be forgotten

The first is direct assistance in the form of hospitals and health clinics together with visiting personnel on short or long tours either for work in medical schools or to help in the estab lishment of these clinics

The second is proper education and assurance of opportunities for learning for the group of selected students who come to this country for postgraduate education

And the third as noted in the editorial is the restoration of medical libraries in various Asian countries Many such libraries were destroyed in World War II and have not been replaced This great handicap upon the medical schools and practitioners could be overcome without heavy expense There are also acute needs for technical aid in medicine for hospitals drugs and medical supplies

The language of the medical schools in most of these countries is English Therefore any books periodicals or old files of our journals will be greatly welcomed either by individual friends or by medical schools hospitals and medical libraries in these countries

Frank B Berry

FRANK B BERRY M D
Assistant Secretary of Defense
(Health and Medical)

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FRANK B BERRY M D
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A MOUTH TO MASK RESUSCITATION DEVICE

HENRY W SEELER *M E*

UNDER the auspices of the Army Chemical Center a number of medical authorities[1-4] in the field of artificial respiration completed an investigation program in which they compared the efficiency of the traditional manual resuscitation methods with mouth to mouth resuscitation The result was highly in favor of the mouth to mouth method with lung ventilation rates far in excess of those obtained with manual resuscitation methods There can be no doubt that the results of this investigation are correct If the ventilation rate with manual resuscitation by trained personnel is so low however what will it be if an untrained layman must work on a patient? It would be interesting to find out how many people in hospitals first aid stations factories and on the street are trained or able to give manual resuscitation It is strongly believed that the percentage is very low Most accidents happen where no highly trained person such as an anesthetist is at hand Resuscitation must be applied within seconds but by whom and how?

OBJECTIONS TO MOUTH TO MOUTH RESUSCITATION

The idea of mouth to mouth resuscitation is actually centuries old Except for a possible implication of a bona fide resurrection it is cited in the Old Testament, II Kings [5] Mouth to mouth resuscitation because of its high efficiency and simple application may provide a much better method for common use The greatest obstacle in applying this method may be appre

From Aero Medical Laboratory Wright Air Development Center Wright Patterson AFB Ohio

Presented 29 April 1959 at the thirtieth annual meeting of the Aero Medical Association Los Angeles Calif

hension on the part of the operator to put his lips full upon the lips of a drowned casualty whose lips may be covered with mud or who may already be dead If a family member is the casualty the mouth to mouth method may be less objectionable In any case the mouth to mouth technic should be initiated immediately therefore the procedure should be made known to everybody A clean handkerchief between the lips of victim and operator may overcome this objection

Is apprehension the only objectionable factor against applying direct mouth to mouth resuscitation? The casualty s breath directly on the operator s face or even in his mouth would be another factor but the main objection will be the dizziness of the operator after a short time of applying resuscitation This dizziness will be caused by hyperventilation from his continuous deep breathing If apprehension as well as hyperventilation of the operator could be overcome by some practical means mouth to mouth resuscitation with its high ventilation rate would be the ideal method for first aid resuscitation Fully aware of these facts this laboratory designed in succession two models of mouth to mask resuscitation devices that have been classed intermediately between straight mouth to mouth and automatic resuscitation methods The latest design that is described here is a simple foolproof and complete mouth to mask resuscitation device that will overcome the drawbacks of the mouth to mouth method The control valve and associated tubing employ engi neering and physiologic design principles that direct the sub ject s exhalations away from the operator and permit prolonged cyclic ventilation without exposing the operator to the effects of hyperventilation The design could be adapted to any mouth to airway or mask to-mask resuscitation system It can be used in normal rescue situations and has been adapted for use with appropriate filters to protect the operator and subject in con taminated atmospheres

THE RESUSCITATION DEVICE

The diagram of the complete mouth to mask resuscitation de vice is shown in figure 1 According to research conducted by the Army Chemical Center the dead air space for the operator should be fixed at 300 ml to maintain a normal carbon dioxide pressure (tension) (pCO_2) in the alveolar air This will avoid hyperventilation of the operator The basic part of the whole system is a simple control valve shown in the center of figure 1 This valve consists of three parts a lower and an upper valve housing interposed by a specially formed or flat diaphragm The parts can be joined together permanently because no repairs will be necessary especially if the diaphragm is of silicone rubber With silicone rubber the complete valve can be cleansed

and sterilized repeatedly without taking the unit apart A quadruple flapper, shown above the valve parts in the center of figure 1, is inserted into a groove in the upper valve housing and serves as the inhalation valve for the operator

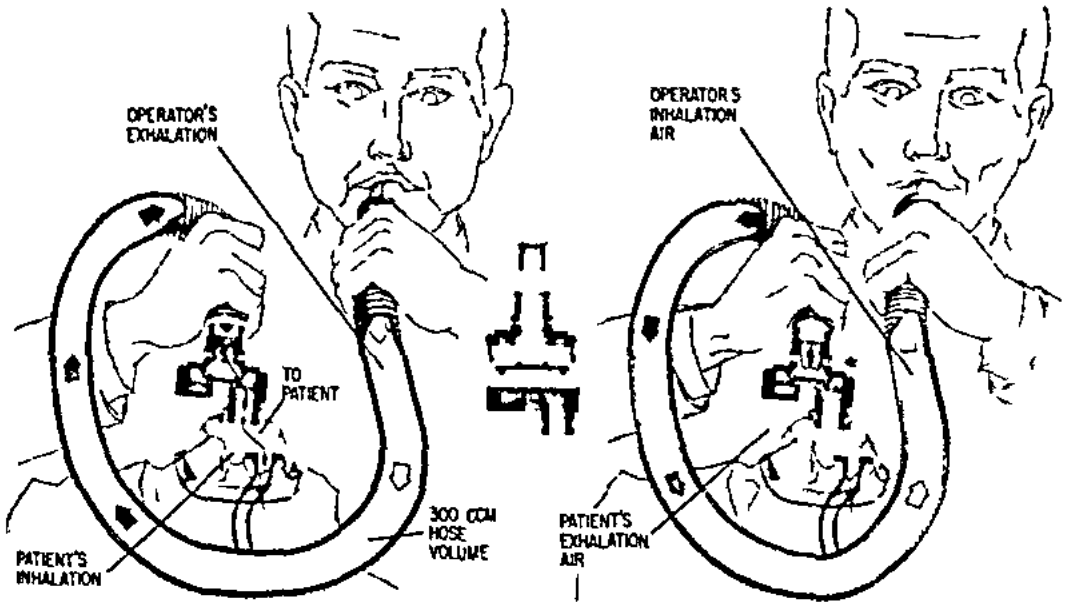


Figure 1 Diagram of mouth-to-mask resuscitation device

The illustration on the left of figure 1 shows the patient's inhalation phase After inserting the proper airway into the trachea and positioning his jaw forward the mask will be put on the patient s face The operator first blows the hose content of 300 ml of fresh air into the patient s lung After that, his exhalation air will follow While the operator is blowing air the diaphragm will move away from the upper valve seat and allow the air to rush freely through multiple holes in the diaphragm through the lower valve housing and mask into the patient s lungs Simultaneously the diaphragm will be pressed onto the lower valve housing seat which closes the exhalation port for the patient

At the end of the operator s exhalation, see right hand illustration in figure 1 the air pressure in the hose drops to zero, and the higher air pressure in the patient and mask initiate the patient's exhalation phase and closes the upper valve seat This action blocks the air flow back into the hose and, simultaneously opens the lower valve and exhalation port to allow the patient to exhale freely During the patient's exhalation, caused by the air pressure in his breathing system, the operator starts to inhale He does not inhale through his nose but through the mouthpiece drawing the initial gas content of 300 ml of his own previously exhaled air from the hose followed by fresh outside air that enters through four holes in the upper valve

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ard, unmodified gas mask inhales through a 300 ml hose with a standard gas filter attached to its other end Temporarily the hose is clamped onto the gas mask exhalation valve outlet The exhalation valve itself is opened temporarily with two extensions from the inside which are a part of a temporarily inserted mouthpiece for the operator The mask for the patient is fastened on the breathing control valve When the operator exhales, he blows through the hose and control valve into the

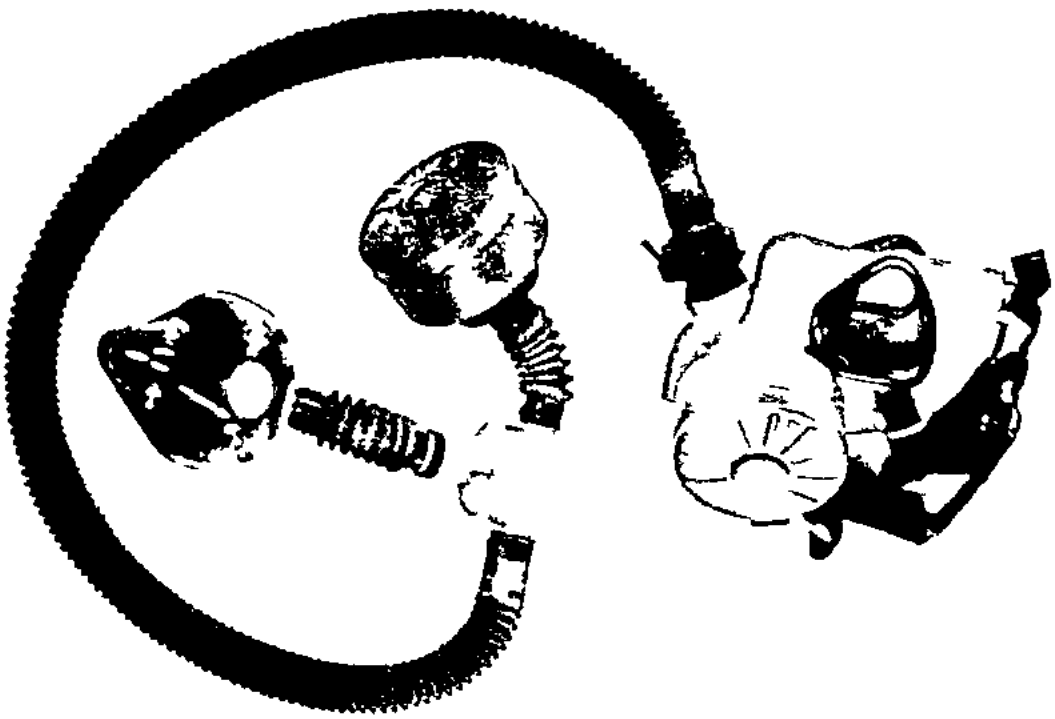


Figure 3 The mask-to-mask escape kit for use in a contaminated atmosphere

patient Excess air during this phase is vented through the mask exhalation valve The patient exhales in the same manner as described before except that his exhalation port has an exhalation flapper valve that prevents contaminated air from entering the system after he starts to breathe by himself The patient also inhales through a standard gas filter located close to the control valve The operator can remove the mouthpiece and hose from his gas mask easily and inhale through the gas mask filter When removed from the gas mask the open end of the hose can be closed automatically by a check valve or plug

For both the contaminated and noncontaminated atmosphere models the operator's mouthpiece or mask connection can easily be replaced by bellows This however, means more equipment and consequently more weight a larger package, higher cost and inflexibility

SUMMARY

Four resuscitation systems are discussed

1 *Manual resuscitation* This method can be used without any equipment and will cause no apprehension It requires a high degree of training for which few people can qualify Lung ventilation is very low and as a result death rate attributable to this system is high

2 *Automatic resuscitation* This technic will cause no apprehension The efficiency rate is highest but the cost factor is comparatively high also and not enough kits are available A lower death rate would be expected were more equipment available

3 *Mouth to mouth resuscitation* Like manual resuscitation this method requires no equipment but arouses a high degree of apprehension on the part of the operator It requires little training but is highly efficient in lung ventilation It will fatigue the operator in the shortest time because of hyperventilation Death rate will be low

4 *Mouth to mask resuscitation* This method will require little training but some inexpensive equipment will be needed It will not cause apprehension and will not exhaust the operator Its efficiency in lung ventilation is high Death rate will be low and can be improved by equipping all types of vehicles with this small and uncomplicated device

REFERENCES

1 Co p D Y *A Mask To-Mask R suscit tor Propo d f Chem l Corp U* U S Army Ch m l Co p M d cal L b y Sp l R port ML 10-292-(54)

2 G d A. S F y C. W G t l L S d M. S nd B t E J J M h to-m h er us ma ual art f l p f h ldr d ad l *J A M A* 167 320-328 M y 17 1958

3 S far P V lat ry *ff* y f m uth-t m th rtif l pur urway b tr dur g m ual and m h- o-m uth rt f l pur *J A M. A* 167 335 341 M y 17 1958.

4 El m J O G D G B w E. S d Cl men J A Oxyg d b d d hang d ergy f p ed ir *J A M A* 167 328-334 M y 17 1958

5 *H fy B bl* II k g h pt 4 er 34

6 S let H *Design Proposal for Armed F rc R suscit at Kit* USAF A M d l L bo ry WADC T h l R port 56-632 AD 110647 D 1956 pp 11 12

Th hardest convict on to get into the m nd of b ginner s th t th ed cat on po wh ch he is engaged is not c lleg cour e ot a med c l cours but a life co rse for wh ch th work f a few y ars under teachers i b t preparatio —*Sr W ll am O ler*

ENURESIS IN RECRUITS

Double Blind Study with Equanil and Review of the Literature

HERBERT M ADLER *Lieutenant MC USNR*

MOST PHYSICIANS define an enuretic as someone who has not attained nocturnal bladder control by three years of age [1, 2] Currently, the incidence of enuresis in military recruits is about one per cent and it accounts for about one quarter of the neuropsychiatric discharges during recruit training It is a demoralizing problem both to the individual and to the group in which he functions Treatment in the military forces is discouraging and more often than not ends in failure and discharge of the recruit If a simple way could be found on initial interview to differentiate those persons with an excellent prognosis from those with a poor prognosis therapeutic efforts could be made more effectively Furthermore if information gained from a brief initial interview could provide a criterion for establishing whether an anxiety relieving agent would or would not be indicated, treatment of the selected group would be simplified It was with these aims that this double blind study and statistical analysis were undertaken

REVIEW OF LITERATURE

Characteristics of Enuretics

An enuretic is generally considered to be someone who has not attained bladder control by the age of three It is not known what the incidence of enuresis in the general adult population is but Levine[3] working with Navy recruits found it to be 12 per 1 000 and noted that enuretics comprise 24 per cent of the neuropsychiatric discharges

Enuretics generally are not average people who happen to wet the bed as an isolated symptom Berdie and Wallen found enuretic recruits to have an average general classification test score of 80 10 20 points below the score of the controls which was 100 55 They differed from the controls also in increased nervousness lack of confidence nail biting, somnambulism, talking

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From the Recruit Depot San Diego Calif Dr Adler is now at Pennsylvania Hospital Philadelphia, Pa

in their sleep backaches and dizzy spells Studies by Gerard covering 72 cases found that the largest single group consisted of psychoneurotics The boys were characteristically passive retiring self depreciatory insecure slow and dawdling in activ ity No less than 42 per cent of enuretics were found to be nail biters [3]

Benowitz working with enuretic Air Force recruits found that 50 per cent of them came from homes broken by the separation or divorce of parents Approximately 60 per cent were rejected by their fathers felt hostility toward their fathers or the father was absent from the family picture Over 50 per cent showed a marked dependence on a mother figure while 10 per cent were actively homosexual or had strong latent homosexual drives As a group they related well to siblings with no excessive rivalry and had little or no conflict with civilian authorities Only 1 per cent conflicted with Army authorities Chronic complainers numbered 16 per cent. Unfortunately this study included no controls

The physical complaints in a group of 100 enuretics were broken down by Shlionsky and associates into the following categories backache 59 musculoskeletal 35 gastrointestinal 13 and cardiovascular 6

Pierce and Lipcon found a relationship between enuresis somnambulism and epilepsy They found that 61 8 per cent of sleepwalkers are enuretics and that 26 6 per cent of enuretics are sleepwalkers The enuretics were four times as lil ely as the controls to have a family history of somnambulism they were three times as likely as the controls to have a past personal history of somnambulism and they were one and one half times as likely as the controls to require dental care The authors point out that both epilepsy and enuresis have heredofamilial and nocturnal relations and that some cases of somnambulism are indistinguishable from psychomotor epilepsy Frary hypo thesized that enuresis and dental caries may be related to a disorder of calcium metabolism that influences both

Backus and Mansell working with 277 enuretics in the British Army were able to classify them into the following personality types 48 per cent timid immature and dependent (nearly all were persistent bedwetters since infancy without remission) 27 per cent average 10 per cent reaction type compensatory aggression 6 per cent pure aggressives 6 per cent sociopaths and 3 per cent obsessionals

Michaels made an interesting classification of enuretics on the basis of their past personal history He divided enuretics into two groups (1) transient group *i e* bedwetting occurred

after tho establishment of nocturnal bladder control These he found to be chiefly neurotic (2) Persistent group, *i e* persons who had never established nocturnal bladder control These he characterized as "constitutional " They were lowest in obsessive compulsive and manic depressive traits and highest in sociopathy He observed that character disorders and enuretics had the following traits in common heightened neuromuscular irritability impulsiveness, lack of control, and low anxiety tolerance

In a later publication Michaels[12] hypothesizes that failure of vesicular control is but a focal localized example of the sociopath s general failure to control his impulses and states that enuresis is more prevalent in all behavior disorders Silverman[13] found prolonged enuresis in 33 per cent of criminal psychopaths This contradicts the study by Benowitz,[6] but is supported by Hirsch[14] who observed that 32 per cent of 367 delinquents were enuretics

In summary, it appears that enuretics have traumatic childhoods with maternal overdependence and hostility toward their fathers They tend to be immature and of lower than average intelligence they have more physical complaints, and are more prone to epilepsy and somnambulism Most are characterized as passive, dependent, insecure, and timid while many exhibit a generalized sociopathic weakness of impulse control

Causative Factors

Enuresis is influenced by almost as many factors as there are investigating specialists in the field This is quite natural in a symptom complex that involves physiologically several different body systems and is doubtless determined by multiple factors

The schools of thought may be broken down into four categories (1) psychologic as an expression of internal conflict (2) psychologic as a failure of training (3) organic the genitourinary system and (4) organic the nervous system

Psychologic Internal Conflict

Phyllis Greenacre[1] contends that urination and weeping alike are mechanisms for discharging tensions and that frequently there is a reciprocal relation between the two Boys are more commonly enuretic than girls because acculturation bars them from tearful discharges The first tears occur at one month of age and the infant frequently cries in his sleep when he urinates Weeping is derived from a conflict over childhood urination and penis envy

This is in essential agreement with Fenichel[1] who notes a passive "letting flow" characteristic of both urination and weep

ing or alternatively fantasies of penetration and destruction In addition the urethral discharge and retention pleasure are the unconscious equivalents of and substitutes for masturbation Further the fantasies surrounding enuresis are proper to the opposite sex In girls it is penis envy in boys passive urination This may explain the so frequently found predominance of timid passive male enuretics

That enuretics have a past history of unsatisfactory relation ships with significant adults few doubt The nature of that relationship is considered by Kriegman and Wright [7] to be a too intense emotional attachment to and dependence upon maternal figures Odlum believes that this factor more than any other accounts for the higher incidence of enuresis in males since males are more indulged and kept more dependent on their mothers than females Benowitz adds the observation that coupled with this identification with a passive warm overprotective mother is an underlying hostility toward the father who is frequently aggressive abusive and domineering

The question arises whether enuresis is the same thing in children and adults According to the electroencephalogram it is not Ditman and Blinn found that the childhood enuretic char acteristically urinates in deep sleep the adult enuretic does so in a light sleep This latter finding seems reasonable when we consider that micturition involves not only the bladder but tension on the abdominal and pelvic muscles both voluntary muscle groups to increase intra abdominal pressure This brings enuresis within the realm of a dissociative state similar to somnambulism an aspect which has been elaborated by others

Psychological Factors—Training Failure

The distinction between training and psychodynamic causes is a vague and perhaps artificial one especially when we con sider the inextricable interpersonal factors involved in bladder training Huschka speculates that the frequent employment of coercive methods in bladder training may account for the ob servation that the enuretic child unconsciously uses urine as a destructive agent directed against those whom he wishes to punish As a further interpretation of the Benowitz case histories the child may introject the abusive father as well as the passive mother Huschka also points up the sadistic destructive and incendiary aspects of enuresis

The justification for distinguishing training as a significant cause is the fact that after all bladder control in our culture is a learned pr cedure which is imposed on us some time before we are quite dy to accept it Berdie and Wallen working with enuretic nav recruits found that enuresis frequently results from early environmental conditions that do not favor learning

in general The recruits' generally lowered academic achievement as expressed in the general classification test score attests to this The etiology of sociopathic character disorders is not understood but certainly their generalized poor impulse control, that includes poor bladder control, involves the failure to in corporate social pressures

Organic—Genitourinary Causes

Forsythe and Karlan[21] working with 25 young male enuretics found urogenital factors to be etiologic in 13 cases and were able to illustrate pathology in 22 out of the 25 They classified the causes of enuresis into two broad categories (1) urogenital, dysfunction of the detrusor urinae or internal sphincter, veru montanitis, urethrotrigonitis, obstructive or inflammatory lesions and (2) neurological lack of cerebral inhibition of the external sphincter

Some cures were obtained following the urologic procedures The authors conclude that the good results following urethral dilatation, silver installation, and vesical lavage may have been due in many instances to the inadvertent treatment of local pathology In evaluating improvement the authors take no account of the inadvertent administration of supportive, suggestive, and coercive psychotherapy associated with their procedures

Other studies by urologists reveal similarly high incidences of urogenital pathology Cohen[22] demonstrated a shortened trigone and verumontanum in 24 of 25 random enuretics Unfortunately there were no controls

Organic Cerebral Causes

Since enuresis occurs during sleep it is natural to search for its cause in the sleep mechanism Ström Olsen[23] implicated the lateral and possibly posterior hypothalamus which are associated with both the sleep walking mechanism and the mechanism of micturition Of 28 adult enuretics studied, 25 showed a hyper somnia They presented a picture of levelheaded stolid, im perturbable individuals with a characteristic lack of anxiety and a lowered emotional tone They were incontinent during heavy sleep and he labeled them "saturated sleepers " He found them to have a typically high tolerance for d amphetamine which had to be pushed to as high as 10 to 30 mg to lighten sleep suf ficiently to prevent incontinence The drug worked, he contended by increasing corticohypothalamic impulses and the cortical inhibitory impulses to spinal reflexes

This explanation on the basis of "hypersomnia" is in dis agreement with the electroencephalographic studies by Teicher[24] and Ditman and Blinn [19]

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individual sessions in brief psychotherapy averaging 5 4 hours per patient The general approach was initial acceptance of the patient as he was After the establishment of a positive rapport, the therapist s firm expectation is that the patient will grow up and discard immature behavior patterns including enuresis

Enuresis was regarded as stemming psychologically from a lack of satisfactory and appropriate relationships to significant adults The therapeutic relationship presumably met this need Kriegman and Wright believed that the military setting of the treatment magnified the therapist as a powerful parental figure, an advantage not enjoyed by the civilian physician Of 25 pa tients in treatment they reported 16 successes, 4 improved and 5 failures The failures they found to have an intense emotional attachment to and dependence upon maternal figures

Three years earlier Backus and Mansell[19] had employed a different psychotherapeutic technic on a larger group of British soldiers with less noteworthy success Instead of individual therapy they used a group approach with sessions held on the ward The patients were given breathing exercises in raising the diaphragm to reduce intra abdominal pressure and thus relax the bladder They were instructed to exhale and hold the sphincter tight. The suggestion was given repeatedly to "sleep tight" that is they would sleep with a tight sphincter but the bladder would be asleep and relaxed like the rest of the body The ex planation was given that they would awaken at night from the struggle between a full bladder and a tightened sphincter Failures were explained away by pointing out that it takes babies three to four years to gain bladder continence and they should not be discouraged therefore if success were not immediate

Backus and Mansell found that difficulties in treatment were associated with age (over 30) chronicity psychoneurosis and an anatomically or physiologically small bladder Of 277 persons treated 113 were discharged to full duty and 40 were returned to limited duty

Training procedures Symptomatic treatment of a condition believed to be largely psychogenic in origin frequently stirs up fears as to what will now become of the blocked conflicts hitherto expressed through the symptom in question What dis ruptive effects will they have on the psychic [illegible] Davidson and Douglass[24] challenge this approach as futile and harmful These authors treated 20 cases with an alarm mattress that rang an alarm at the first few drops of urine There were 3 females and 17 males ranging in age from [illegible] Fourteen were cured and six improved

They contend that while enuresis may [illegible] important role in maintaining intrapsychic [illegible]

persist long after the original causes are no longer operative Then it becomes no longer a response to anxiety and frustration but a stimulus itself calling forth these inimical feelings and impeding emotional growth and social adjustment In their group they found that once enuresis was relieved the personality frequently changed from a shy to an assertive one

Just as Huschka[3] discredited the age old punitive method so Odlum decried the other popular technic namely water restriction He contended that excessive water restriction frequently aggravates enuresis by increasing the concentration of the urine and causing bladder neck irritation This may account for the occasional success reported with diuretics [3] Going to the other extreme Nichols[2] encouraged his patients to drink fluids in excess and to achieve bladder mastery through voluntary daytime inhibition of the external sphincter reflex waiting increasing periods of time after the urge to urinate became felt

Berdie and Wallen used similar daytime bladder control but added to it environmental manipulation in order to alleviate external sources of anxiety

Drug therapy Because micturition involves several physiologic systems and because there are many drugs with known effects on these systems it is not surprising that a great variety of drugs should have their advocates and their rationales Only one typical drug from each class will be discussed

1 *Parasympathetic nhibito s* Because of its effects in blocking reflex bl dder emptying Banthine (brand of methantheline bromide) in doses of 50 mg at bedtime has long been the main tay of practitioners One tudy[29] reports 8 successes o t of 11 pat ents treated No controls were included and personal experience does n t co firm this

2 *Subcortical inhib t rs* Reserpine was used by Lambros n 1 5 mg daily doses because of its inhibiting effect on efferent stimuli to the hypothalamus the highest center of the autonomic nervous system *He achieved initial success in 16 out of 17 cases treated b t could repeat his good results on only 1 patient after* a two week intermiss on w thout the drug

3 *Co tical stimulants* D-Amphet m ne in doses from 10 to 30 mg at bedt me was used by Strom Olsen [3] both because of its established success in l ghten ng sleep and facilit ting cortical cont l a d ts p esumed effect on the lateral and posterior hypothal mus wh ch are as ociated with the sleep-waking mechanism and th m chan m f micturition Daytime bladder control is mai t ed by co t cal hibitory impulses to sp nal reflex s and corticohyp th l m mpulses The a thor contends that d amphetamin n larg d e re- tablishe cort c l pr m cy

Hormones Methyltestosterone was used on 50 children aged 3 5 to 14 years via injection orally or by topical application to the lower abdomen once or twice daily It was hypothesized by Schlutz and Anderson[31] that this stimulated the maturation of a basically immature urogenital system They found that 54 per cent were completely cured 34 per cent were much improved and 16 per cent showed no improvement

None of the above studies had any controls One very well conceived experiment by Browne and Smith[27] in an orphanage tested a variety of drugs including ephedrine, extract of bella donna, Trasentine (brand of adiphenine hydrochloric acid), physostigmine, and theophylline, using controls, and found no significant results from any of them A diuretic, mersalyl had a good effect for three weeks, but in the fourth week results were poor

Genitourinary manipulations Those who believe organic pathology to be etiologic in enuresis also pursue therapeutic technics aimed at eliminating this pathology Forsythe and Kar lan[21] employed urethral dilatation silver installation, and vesical lavage No figures are given for the results of this treatment but some successes are implied

Comments

The treatments for enuresis range as far afield as the theories of its causes That there are many therapeutic triumphs is every where in evidence There is rarely, however, any control and even more rarely any attempt to characterize the psychologic and physiologic differences between the successes and the failures

Psychotherapeutic cures range from 64 per cent[17] with in dividual therapy to 41 per cent[10] with group therapy Training procedures with an electrified mattress yield as high as 70 per cent cures while some[2] report as high as 73 per cent with drugs Few people publicize their failures but it seems likely, from the foregoing that any therapeutic attempts on a nonselected population should be crowned with successes in at least 40 per cent of cases treated The lower age groups with higher spontaneous remission rates yield correspondingly higher per centages of cures [32]

METHODS OF STUDY

The subjects for this experiment were 102 male recruits between 17 and 20 years of age who were undergoing boot training These men were sent to the neuropsychiatric unit by their drill instructors or the sick call physicians because of current enuresis The frequency of enuresis ranged from once a week to seven times a week A urinalysis was done on each man and he

was closely questioned for symptoms of genitourinary pathologic abnormalities No one with any evidence of organic defect was included in the experimental group Urinary frequency was a common symptom but in the presence of a negative urinalysis and in the absence of related symptoms it was considered functional Except for the above restrictions no enuretic was excluded from the experiment The data was collected during the period from July 1957 to April 1958

Factors Studied

The following factors were evaluated

1 *Motivation* Positive or negative motivation for duty in the Marine Corps was judged according to the recruit s own statement and his drill instructor s opinion

2 *Personality* A passive or aggressive personality type was determined in the initial interview and from the drill instructor s description of his performance at duty The aggressives were the hard driving persons who functioned at a high energy level and often exhibited leadership qualities The passives" were typically timid accepting their symptom and unlike the aggressives gave no history of active personal attempts to overcome their enuresis

3 *Unclassified* Only the extremes at either end of the continuum of motivation and personality were so designated Where there was any doubt about either the recruit was considered unclassified with regard to both these factors

4 *Treatment* Either Equanil (brand of meprobamate) or a placebo was dispensed according to a double blind technic

The management of the enuretics consisted of supportive and suggestive psychotherapy which was the same for everyone plus the distribution of medication which was divided equally between a placebo and Equanil

Psychotherapy centered around a brief explanation of micturition together with bladder exercises and a self regulated stepwise increase in dosage The exercises required no fluid restrictions but involved a positive attempt by the recruit to delay urination for varying periods of time beyond his initial urge to void A feeling of acceptance and optimism were communicated to the recruit

Medication consisted of bottles of 50 tablets and all tablets were stamped in the same mold The bottles were marked either 1 or 2 and it was not known to the experimenter until the conclusion of the experiment which contained Equanil and which a placebo The recruits received either one or the other medication but never both

recruits were instructed to take one tablet four times intil they wet the bed At that time they were to increase sage to two tablets three times daily If enuresis continued, ere then instructed to increase the dosage to two tablets nes daily and to continue at this dosage level until their re tment date

Continuity Enuresis was classified as either transient or tent, as determined from the initial interview The transient ics were those who gave a history of a remission in their m of at least one year's duration at any time in their life ersistent enuretics were those who gave no such history gnificant remission

Disposition Either cured or uncured enuresis was determined recruit's response to his treatment Those who had ov er their enuresis completely or did not wet the bed more than n a three week period were considered "cured" and kept at uty Those who continued to wet the bed more than once hree week period were considered uncured and discharged the service This was determined by written records kept by the recruit himself and independently by the drill in or

EXPERIMENTAL GROUPS

the basis of a combination of two or more factors the fol g groups were identified and studied

up I consisted of 50 recruits This group was designed t the effectiveness of the factors of motivation, personality, eatment on disposition

up II consisted of 52 recruits It was designed to test the iveness of treatment alone on disposition

up III consisted of the last 36 recruits collected in the imental sample of the 102 studied (*Groups* I and II) This was designed to test the effectiveness of continuity on sition

ule of Evaluations

e initial interview lasted about 25 minutes and consisted istory taking evaluation with regard to pertinent factors, ioution of medication and brief psychotherapy

e second interview came three weeks later All unused medi n was returned Those classified as uncured were admitted ie psychiatric observation ward for at least one week before harge while those classified as cured were returned to duty a reappointment in three weeks

he third interview came three weeks after the second one a simila procedure was followed for the cured and uncured ps

The group considered cured at the third interview was followed to graduation from boot camp and again to the successful completion of advanced infantry training at Camp Pendleton

Recording of Data

The data were recorded in two ways (1) As the sum of frequencies of enuresis before during and after treatment (2) According to the final disposition of the recruits as cured or uncured

Analysis and R s lts

Group I Originally it had been planned that the data were to be statistically analyzed as a three way unequal subclass frequency analysis of covariance design Preliminary analysis and tests indicated however that the motivation factor did not have a significant effect nor did it interact to any great degree with the personality and treatment factors Therefore the motivation factor was abandoned to simplify the statistical analysis

The independent variable was the frequency of enuresis during a three week period prior to treatment and the dependent variable was the frequency of enuresis during a three-week period after treatment (table 1) No use was made of the frequency figure

TABLE 1 *E// / at ent and perso l y / qu y / en*

P on l y	T at									
	Equa l			Pla bo			A			
	\	P R	P st R	N	Pre-R	P R	N	P R	P R	P
P	16	10.88	11 38	16	11 12	10 25	32	11 00	10 81	30
A g	11	8 64	3.82	7	5 57	6 71	18	7 44	4 94	15
A g	2	9 96	8 30	23	9 43	9 17	50	9 72	8 70	40

re- requenc / ure urin hree-wee period prior to tre treat.
os requen ure durin three-w k pe od treatme
umbe
proba spre sed vel f onf de

for the three week period during treatment For those uncured recruits who were admitted to the psychiatric observation ward after the second interview the sum of the one week frequency of observed enuresis was multiplied by three to make it comparable to the cured recruits who stayed on duty

The statistical analysis showed that the treatment means were not suggestive of a significant difference ($F < 1\ 00$) either when analyzed independently of the pretreatment effect or adjusted for them through an analysis of covariance

The analysis of covariance of the aggressive personality was suggestive of interaction with Equanil

Obviously the observed proportion of cured patients using Equanil equaled the observed proportion of cured patients using

the placebo and no statistical procedure was necessary to test the effectiveness of the treatments on the basis of disposition There was no difference between the group tested with Equanil and the group tested with the placebo

Group II Table 2 shows the effect of treatment on disposition of the entire sample (102 recruits) Data on effect of treatment in an unclassified group is shown in table 3

TABLE 2 *Effect of treatment in 102 recru ts*

Dispo ition	Treatment	
	Equanil	Placebo
Cured	22	22
Uncured	29	29
Total	51	51
Proportion cured	43	43

TABLE 3 *Eff ct of treatment on the f quency of enuresis n an unclassified group*

Equanil			Pl c bo			A rag			
N	Pre-Rx	P st Rx	N	Pre-Rx	P t Rx	N	Pre-Rx	P t Rx	P
24	7 71	7 76	28	8 64	7 29	26	8 21	7 53	> 40

Pre-Rx = fr que cy of nure dur ng a thr e-w k per od pr to tre tm nt.
P st Rx = fr q ncy of ur s du_ing thr e-w k period ft r tr tm t
N = the numb r f r cruit
P = pr bab l ty xp d l v l of nf d c

An analysis of variance showed the posttreatment means to be not significantly different ($F<1\ 00$) from the pretreatment means This was also true when the posttreatment means were adjusted for the pretreatment means by an analysis of covariance procedure

Group III Data concerning recruits in group are given in table 4

Preliminary analysis indicated that the factors of motivation, personality treatment and disposition did not have a significant effect or interact to any great degree with each other Therefore, continuity and disposition were treated as a two factor contin gency table

DISCUSSION

The classification of initial motivation for duty was chosen because it was believed that if a recruit saw some secondary gain in his symptom, such as a hoped for discharge he might not try too hard to overcome it or he might be an outright ma

lingerer The results did not bear out this point Initial moti vation did not affect either the frequency of enuresis or the final disposition of the enuretic The explanation for this may lie in the fact that the experimental procedure required that all enu retics remain at duty for three weeks before being seen again at the neuropsychiatric unit The line officers co operated ef fectively with this procedure It may be that there was so much social pressure in the platoon setting that, even if a recruit were initially content to wet the bed and be discharged these pressures stimulated him to overcome his enuresis if he could In other words further trial at duty neutralized or nullified some of the secondary gain involved in enuresis

The personality classification of "passive or aggressive was chosen because the psychoanalytic literature[1] distinguishes between the passive feminine letting flow" fantasies and the active masculine sadistic fantasies of penetration Because

TABLE 4 *R l t / t ty / t d p ti*

D po	P t	Tran t	T l mb	P e t tran t
Cur d	5	11	16	68
U ur d	18	2	20	
T al	23	13	36	36
P port ur d	22	85	44	P = < 001

λ = 13 3 d g f f d m = 1

the relatively superficial nature of the contact with the recruits did not allow an honest determination of sadism in the individual the more easily arrived at label of aggressive was used in stead

It was believed at the outset that Equanil a muscle relaxant and anxiety relieving agent might benefit the aggressive in dividual but work to the detriment of the passive individual This was only partially borne out (table 1) There was no dif ference in the response of the passive enuretic to Equanil as compared with a placebo The aggressive enuretic however benefited more from Equanil than he did from a placebo and this difference reached a level of confidence of 15

The passive enuretic in this sample is probably the same stolid imperturbable saturated sleeper that Strom Olsen[1] described and the timid immature dependent persistent enuretic that Backu a d Mansell had difficulty treating Strom Olsen reported g oo l re ults with large doses of d amphetamine a cortical timulant but Backus and Mansell encountered difficulty in group th rap with this type The relatively poorer results of

Equanil with the passive enuretic in this experiment are therefore not surprising It would seem that in this type of individual a little constructive anxiety would be a good thing

For the aggressive enuretic, Equanil probably brought about an appropriate alleviation of emotional tension (perhaps abdominal and pelvic muscular tension) that may have made a urethral discharge of conflicts less necessary or less possible So, while the over all effect of Equanil and a placebo were the same (tables 2 and 3) this personality treatment trend stands out and is entitled to consideration in differential treatment of clearly identified aggressive enuretics

It was observed (tables 1 and 3) that passive enuretics characteristically had a higher pre treatment frequency of enuresis than either the aggressive or unclassified enuretics This distinction attained a level of confidence of *less than* 05

The supportive and suggestive psychotherapeutic approach used for the entire sample was essentially a combination of the the technics described by Backus and Mansell[10] and Berdie and Wallen [4] The "physiologic" explanation, the bladder exercises," and the self regulating dosage schedule were designed to give the enuretic a sense of mastery and control over a symptom in whose grip he found himself helplessly entangled It was hoped that in an understanding but demanding atmosphere his role would be transformed from a passive to an active participant in the management of his problem Nothing beyond this is claimed for these technics and other approaches could accomplish the same effect

On purely experimental grounds, it was unfortunate that there were no controls for the psychotherapy This opportunity was foregone because it was considered that the primary purpose of the neuropsychiatric unit was to do everything possible to help these recruits to complete their training successfully

Berdie and Wallen published no figures but Backus and Mansell[1] did and they were able to return 41 per cent of the 277 cases treated to full duty The constitution of their sample, psychotherapeutic technic criteria for cure, and results are almost identical with those employed in our experiment The one exception is the adjunct of Equanil and a placebo for which no significant over all difference was found (tables 2 and 3) Since the psychotherapeutic approaches and the rates of cure for these two studies were essentially the same, it seems reasonable to conclude that the effective factor in this experiment, similar to the Backus and Mansell experiment, was psychotherapy One might add also that any intensive treatment program for a similar population of enuretics should achieve at

least a 40 per cent rate of cure Indeed few investigators report a lower rate It would be interesting and perhaps fruitful to combine established psychotherapeutic technics of self mastery, suggestion and support with some of the high yield drugs reported in the current literature

Unfortunately it was not until two thirds of the experimental sample had been collected that the significance of a history of continuity or lack of continuity of the enuretic symptom became evident Consequently only the last 36 cases collected were classified with regard to continuity either persistent or transient This distinction had been described first by Michaels [1] in 1941 but no special use had been made of it as a prognostic indicator About one third of the 36 recruits in group III (table 4) could be classified as transient enuretics and they had a rate of cure of 85 per cent The rate of cure for the two-thirds who were persistent enuretics was only 09 per cent The difference in disposition between these two groups is significant at a level of confidence of less than 001 The disposition for group III was not significantly affected by motivation treatment or personality factors The number of cases was too small to justify a statement of personality differences between the transient and persistent enuretics However the impression gained was that the persistent enuretics tended to fall into the passive classification

It may be that this symptom in the transient enuretic represents a reactive situational regression of more or less fleeting significance in the personality structure On the other hand persistent enuresis probably represents something insidious and pervasive about the personality structure that justifies its consideration as a separate syndrome The significantly different response to therapy supports this distinction The difference in prognosis between these two groups may also serve as an indication or contraindication for treatment in the military

The proportion of cured for group III is 44 This is essentially the same as the 43 proportion for the entire sample of 102 recruits indicating that group III constituted a representative sample of the whole The transient enuretics made up 36 of group III but accounted for 68 of the cures It is likely therefore that had the classification of continuity been applied to the entire sample of 102 it would have been found that two-thirds of the number cured was composed of transient enuretics although they constituted only one third of the sample

Support is gained for the symptomatic treatment of enuresis by the fact that of the 44 cured enuretics all but 3 who received medical surveys for unrelated causes graduated from boot camp

and successfully completed one month of advanced infantry train ing at another base

GENERAL OBSERVATIONS

Reference to current psychiatric and urologic literature and the results of this experiment justify certain general observations

In about one third of young adult enuretics the symptom rep resents little more than a regression under stress and is best handled by supportive and suggestive psychotherapy (including a placebo) while the individual remains undisturbed in his oc cupation The prognosis with treatment is excellent and the spontaneous remission rate is probably high

In about two thirds of this same group enuresis may be inti mately associated with one or more characteristics such as physical immaturity below average intelligence, passivity poor impulse control latent homosexuality, epilepsy and dissociative reactions In these individuals who have never established nocturnal bladder control, enuresis almost universally may be considered an indication of a deep personality disorder

A wide variety of treatments have met with success and the approximately 40 per cent cure rate from psychotherapy alone is the least one can expect from a therapeutic program In the military, where treatment is limited, it can be applied most profitably to the group of transient enuretics because they have the best prognosis and are least likely to represent deeper personality disorders

TOWARD A GENERAL THEORY OF ENURESIS

Enuresis as a symptom represents different things in different age groups and personality structures Enuresis during light sleep in the adult is distinguished from enuresis during deep sleep in childhood and may be in the nature of a dissociative reaction in the former Further in some adults with a history of well established bladder control it may represent a transient generalized regression in the face of stress For others with no history of bladder control it may be the final common pathway of inimical psychogenetic and constitutional forces

Micturition is a complex function When the intravesical tension rises above a certain level, rhythmical contractions of the detrusor urinae muscle are set up This is accompanied by re laxation of the internal sphincter and followed by opening of the external sphincter Increasing intra abnominal pressure by contraction of the rectus abdominis and perineal muscles can accelerate this The micturition reflex is mediated by the auto nomic nervous system the sympathetic and parasympathetic

nerves being reciprocal in their actions This function however is unusual in that centers for micturition are situated in the mid brain hindbrain hypothalamus spinal cord and premotor cortex so that voluntary inhibition or facilitation of the reflex is frequent. As there are so many physiologic pathways leading to micturition and involving conscious and unconscious components and as a major dysfunction of any one of these alone or minor dysfunctions of any several of these can culminate in enuresis it is not surprising that a specific cause has eluded us Rather it might be more accurate to think of functional and constitutional factors acting in concert It has long been accepted that not everyone is susceptible to ulcers cancer hypertension asthma or schizophrenia Life situations may evoke these but a stimulus must act on a responsive matrix Such might be the nature of enuresis Certain inimical early life conditions prevail Recurrent among these are passive identification with mother sadistic identification with father impaired ability to incorporate social demands Somehow perhaps because these malevolent factors coincide chronologically with the serial maturation of bladder control centers and because bladder control may become involved in the symbolic expression of passive and sadistic drives and fantasies (analagous to bowel control) conflicts become prone to a urethral pathway of discharge

Facilitating or inhibiting this mode of discharge are such organic factors as the neural maturation of spinal and subcortical centers cerebral cortical dysrhythmias and the threshold of irritability (in health and disease) of the entire genitourinary tract Many of these vectors vary from day to day and most are amenable to various treatments including psychotherapy drug therapy and habit training Many too change with growth and development which accounts in part for a certain spontaneous remission rate

Once firmly established enuresis like stuttering may persist long after the initiating causes have subsided When this situation prevails a symptom which was once the result of personality difficulties now becomes a self perpetuating cause of personality difficulties and purely symptomatic management is justified

SUMMARY

One hundred and two enuretic recruits were subjected to a double blind study involving Equanil and a placebo in conjunction with supportive and suggestive psychotherapy No overall difference was established between the two drugs the remission rate for each being 43 per cent Analysis of personality features however indicated that Equanil selectively benefited the aggressive enuretics A significant difference in the prognosis for transient and persistent enuretics was found

and could serve as an indication for retention or separation from the service

CONCLUSIONS

Initial motivation for service does not significantly affect the results of the treatment of enuretics who are maintained at duty for at least three weeks beyond the initiation of therapy Passive enuretics show no difference in response between Equanil and a placebo Aggressive enuretics benefit more from Equanil than from a placebo

In an unselected group of young adult enuretics there is no significant difference between treatment with Equanil and treatment with a placebo Supportive and suggestive psychotherapy can effect a cure rate of 43 per cent in enuretic recruits These cures are maintained for at least two months after the cessation of therapy Passive enuretics have a higher frequency of enuresis than either aggressive enuretics or the average unclassified enuretic

The alleviation of the symptom of enuresis in a recruit appears to help his total adjustment in training and seems to have no deleterious effect on his personality Approximately one third of enuretic recruits can be classified as transient enuretics Their rate of cure with psychotherapy is 85 per cent Retention at duty and intensive therapy is justified in a recruit who meets the criteria of a transient enuretic Approximately two thirds of enuretic recruits can be classified as persistent enuretics Their rate of cure with psychotherapy is 22 per cent

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REFERENCES

1 Mechlis J J *Disorders of Character* Chicago C Thomas Springfield Ill 1955 p 7

2 Kanner L *Child Psychiatry* 2d ed Charles C Thomas Springfield Ill 1948 p 428

3 Lane A Enuresis in the Navy *Am. J Psychiat.* 100 320-325 N 1943

4 Bender R F and Wallin R S Impsychological aspects of nursis in adult male *Am. J Orthopsychiat* 15 153 159 Jan 1945

5 Gerard M W Enuresis study in etiology *Am. J Orth psychiat* 9 48 58 J 1939

6 Bakwin H H Enuresis in children AAF basic training experience study of 172 cases *J Nerv & Ment. D* 104 66-79 July 1946.

7 Shilsky H Sarnoff L R. and Bischof L J Functional enuresis in Army report of clinical study of 100 cases *War Med.* 7 297 303 May 1945

8 Pratt C M and Lapan H H Clinical relationship of urinary stress to sleep-walking and pyjama *A.M.A Arch Neurol & Psychiat.* 76 310-316 Sept 1956.

9 Fahary R Enuresis genetic study *Am. J Dis Child.* 49 557 578 Mar 1935

10 Black P L and Mills G S Investigation and treatment of enuresis Army preliminary report on 277 cases *Brit M. J* 2 462 465 Oct 7 1944

II M hs l J J *Par ll l* b tw p t nur i d d l q y i p y h p h pe l y *Am. J Orthopsych at* 11 260-274 Ap 1941
12 M h l J J S gnif f p t ur i hi t y f p y h p hi p l y *M l. Surgeon* 95 315 316, O t. 1944
13 S l rm D Cl c l and l ct ph l graph studi ct m l p y ho- p h *A. M A. Arch Neurol & Psych at.* 50 18 33 July 1943
14 Hut h N D M *Dynamc aus f juvenil crim* Sc Art P bl h Cam- b dg M 1937 250 pp
15 G P Ut t d w pl g *Am. J Orthopsychiat* 15 81 88 Jan 1945
16 F h l O *The Psychoanalyt Theory of N uros s* W W N rt & Co I N w York N Y 1945 pp 68-69
17 K i gm n, G and W gh H B B *f p ych h t py* with ur tl Army *Am. J Psych at* 104 254 258 O t 1947
18 Odl m D M N turnal ur i *Brit M. J* 1 8 10 J 6 1940
19 D m K S. d Bl K, A Sl p l l ute *Am. J Psy h at.* 111 913 920 J 1955
20 H hka, M S udy f tr ng l l tary c l f ur i gr p f pt bl m ch ldr *Psychosom. M d.* 5 254-265 July 1943
21 For yth W E J d Karl S C. E ure y ung m l d lt *J Urol.* 54 22 38 July 1945
22 C h D L N ur al ur i dult mal ur l g l tudy *J Urol* 57 331 337 F b 1947
23 Str m-Ol R E ur dul s d b mal ty f sl p *Lanc t* 2 133-135 22 July 1950
24 T b J D E ur t l w f ymp m *Cal forn M d.* 82 392- 395 M y 1955
25 B h W E ur d l *M l Surgeo* 96 244 46 Mar 1945
26. D d J R d D ugl E N ur l ut i *sp* l pp h t t m *Brit M J* 1 1345-47 Jun 10 1950
27 Brown R C. d Sm h A F E ur d l *Brit M J* 2 803- 805 D 6 1941
28 N h l L A E ur s t b kgr und d ut *Lancet* 271 1336-1337 D 29 1956.
29 O Mall y J F and Ow R H B thin th py f ur *M oun M d.* 50 188-189 Mar 1953
30 L b V S *U* f p i ert ur l g l d d o g c on- ul ut l d b d jur *Ann. New York A ad. Sci.* 61 211 214 Ap 15 1955
31 Schl t F W d And C E E d t tm t of e ur i *J Cl n. E docrinol* 3 405 407 July 1943
32. P C. M. Lipc H H. M Lary J H d N bl F H E ur i p ych tr w tud *U S Armed For M. J* 7 1265 1280 Sept. 1956.

OBSTETRICS IN ORBIT

Rock t sh ps a e coming sooner than you think—and what s more they ll need OB men aboard This prediction em rges from a recent meeting f the American Rocket Society Experts there opined that tomorrow s typ cal stro nauts will be husband and wife scientist teams living f r years in space and begetting children en route One OB ma after reading this new annou ced to local colleagues th t he w s already planning a pape entitl d Breech De liv ry Unde Null-Gr ity Condition Outer Space Ob tetr cs *Med cal Economi* September 1 1958

THE CHOICE OF APPENDECTOMY INCISION IN ADULT FEMALE PATIENTS

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PRIOR to 1893 operations for appendicitis were carried out through incisions parallel to the lateral edge of the right rectus muscle McBurney[1] observed that with this incision one consumed time and effort opening the peritoneal cavity, still resulting in the operator working beneath an overhanging shelf formed by the outer part of the abdominal wall, since the appendix usually lies to the right of the incision He then developed the incision which today bears his name

Since then, much has been written and much more has been said about the proper incision to be selected in approaching an inflamed appendix In general the debate has settled down to the McBurney, or gridiron muscle-splitting incision, versus the vertical procedures for entrance into the abdominal cavity

At this hospital both types of incisions have been used, especially in female patients This is a report on the use here of the McBurney incision as compared with the vertical procedures in one specific group of patients women and girls over the age of 8 years in whom an operation was performed with a preoperative diagnosis of acute appendicitis This review covers the period from January 1956 to July 1958 and includes 73 female patients The age range was from 7 to 82 years with an average of 23 6 years The total number of patients having McBurney incisions was 58 (79 4 per cent), the remaining 15 (20 6 per cent) being vertical One patient had both a McBurney and a vertical incision

The average total of hospital days for all 73 patients was 6 85 The average for the patients in whom the McBurney incision was used was 6 5 days and for those with the vertical 8 5 days One might question this figure and state that obviously the vertical incisions were indicated by a more extensive pathologic condition but in practice just the opposite occurred The more

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F m he Surg l Se U S N l Ho p t l Oakland Cal f
P n d by Dr W lt t m et g f th S n Fr cis o ical ociety on 19 Nov mb 1958

serious operative findings with possible serious consequences such as perforation and abscess were found through McBurney type procedures Actually this finding is in keeping with those of many other authors who report a shorter convalescent period with the McBurney technic Gatch and Durman[2] reported that the McBurney incision was used in 229 of 262 consecutive pa tients operated on for appendicitis They had far less difficulty with those in whom the McBurney incision was used and con valescence was shorter as well Truesdell reported 259 appen dectomies McBurney s incision being used in 238 of them, and reached the same conclusions

Criticism of the McBurney incision has been that if one finds pelvic abnormalities or other conditions away from the right lower quadrant the exposure is inadequate There seems to be general agreement that if a condition other than acute appendi citis is strongly suspected and particularly if extensive ab dominal exploration is indicated a vertical incision of some sort should be used However in those situations where one believes the disease most likely is acute appendicitis and on opening the peritoneum finds a situation demanding more ex posure it is a relatively simple task to extend the incision This belief and practice has been reported by many authors and investigators but as stated specifically by Allen those objecting to the use of the McBurney incision for appendicitis do so on the basis that the exposure is limited in patients where the malady lies elsewhere particularly in the left tube or ovary Because the incision can be expanded or extended readily this criticism he thought seems unwarranted Mason and associates used a McBurney incision routinely and needed to enlarge the original wound only 16 times in 545 operations an incidence of 2 97 per cent Our figures show 5 extensions in 58 McBurney incisions an incidence of 8 6 per cent and another incision was performed in one case making a total average of 9 65 per cent incidence where it was necessary either to extend the incision just made or make an additional one Even in the last mentioned case where a McBurney incision was closed and a midline one performed for a bleeding cyst of the right ovary, an element of doubt exists concerning the need for the second open ing

Another basis for comparison of the two essential types of incisions for acute appendicitis is the relative frequency of postoperative wound complications In the 73 cases here there were no instances of dehiscence or postoperative hernia The McBurney incisions were infected following operation especially in perforated cases, in 9 instances but no hernias occurred Carlucci had 32 cases of postoperative hernias in 700 appen dectomies (4 3 per cent) 386 of the incisions were McBurney s with 16 herniations (4 per cent) In 250 vertical incisions 12 hernias (5 per cent) occurred The closeness of these figures is due to the fact that most of the McBurney" hernias followed wound infection and drainage inasmuch as this incision was

preferred for appendicitis with perforation Certainly no definite statements can be made from our small series regarding wound complications, but it seems reasonable to presume that the grid iron incision leaves a stronger abdominal wall than a vertical one

Most surgeons seem to agree that in women where the diagnosis is most likely acute appendicitis, the McBurney type of incision is the one of choice, although many insist on the vertical type because of the possibility of encountering other pelvic disease In our series, 57 of the 58 patients with McBurney incisions had no difficulty and the operations were readily completed, aided by extensions in 5 cases In one case, the incision was considered inadequate at the time and another was required In 2 of the 16 patients with vertical incisions, the pathologic condition justified that decision, but in those 2 the preoperative diagnoses were in doubt from the beginning and at operation were found to be acute cholecystitis and a bleeding ovary

SUMMARY

In the process of examining the histories of the 73 appendectomies reported here with respect to the choice of incision, the following question was kept in mind Is it wise to subject all women being operated upon for acute appendicitis to the increased morbidity of a vertical incision, for the sake of the rare occasion when a second incision might be required to supplement that of an inadequate gridiron type? It has not been possible to settle the issue on statistical grounds, but some evidence has been found to support a negative answer to the question No concrete conclusions can be drawn from our results, but some interesting data have been compiled which support those reported in the literature

REFERENCES

1 McBurn y C. In m d s bd mi l w ll c s f pp d citi w th d pti f n w m th d f oper t g *Ann. Surg* 20 38 43 J ly 1894 C t d in B yc F F *Acut Append cuis and Its Compl cat ns* O f rd U t ty Pres N w Y k N Y 1949 p 263

2. Gatch W D d Durma D C R p rt on 262 ctut c e f pp n- d it *Ann. Surg* 79 862 870 Jun 1924

3 Tr d ll E D Surg al tr tme t f ut pp d t *Ann. Surg* 84 104-111 J ly 1926

4 R y ter H. A *App nd c tis* Surg l M gtaph und r th d tor l supervi f De L w F g e H P l nd Arthur W Elt g D Appl ton & C mpa y New Y rk N Y 1927

5 All j G App ndi t d the ut bd m n. In All n J G Harkins H. N Moyer C A. d Rho d J E (d tor) *Surgery P incipl s and Pract ce* J B L pp tt Philad lph P 1957 p 810

6 Ma M L All H. S. Qu n, F B d G bbs E W R ew of 1 000 c ns c ti pp d t mi *Quart Bull Northwestern University Medical School* 15 1 20 1941 C t d i Boyc F F *Acute Appendicit s and its Compl cat ons* Oxford U s ty P e N w Y k N Y 1949 p 265

7 Carlucci G A. Cit d B y F F *Acute Append cuis and Its Complications* Oxfo d U i r ty Pr s N w Y rk N Y 1949 p 256

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THE ETIOLOGY OF POSTDECOMPRESSION SHOCK IN AIRCREWMEN

W LOCKHART RAIT *W g C mm d RA4F*

THE hypothesis proposed in this report was suggested early in 1952 during a visit to the Royal Air Force Institute of Aviation Medicine at Farnborough England Before this I had been interested in the subject of decompression sickness but previously had not heard postdecompression shock discussed in relation to fatal cases as such occurrences had been unknown in the Royal Australian Air Force On returning to Australia in August 1952 I submitted a hypothesis to the Director General of Medical Services Royal Australian Air Force requesting approval to begin an official investigation in collaboration with the University of Melbourne This was granted, a project was initiated and a grant of money was allocated to the University of Melbourne for the purchase of apparatus and for the procure ment and maintenance of laboratory animals

From the outset I recommended that whether or not the hy pothesis was true the postulated predisposing cause of post-decompression shock a fatty liver should be eliminated as far as possible in aircrews by dietetic instruction and where neces sary by specially approved diets This has been the policy in the Royal Australian Air Force since 1952 at all stations where aircrews have been engaged in high altitude flying Apart from the single case discussed later, there have been no postdecom pression collapses recorded in Australia

During the past four years instruction has been given on the etiology and prevention of postdecompression shock to Royal Australian Air Force aircrew medical officers civil aviation pilots and to the personnel of the aviation medicine training courses who routinely pass through this school of aviation med icine

Two papers have been presented on postdecompression shock one at the British Medical Association s Australasian Congress at Melbourne in 1952 and the other at the Far East Air Forces Command Surgeons Conference at Nagoya Japan in 1955 The

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former paper covered the general aspects of postdecompression shock and its treatment, and the latter was confined to the author's hypothesis and original researches referred to by the Director General of Medical Services of the Royal Australian Air Force in his paper delivered at the Aero Medical Association 1954 meeting in Washington, D C , and later published [2]

THE PROBLEM OF POSTDECOMPRESSION SHOCK

Deaths have been reported in America and England where the only known abnormal environmental change to which the subjects had recently been exposed was low ambient pressure during simulated or actual flight [3-9] In these cases the clinical and postmortem findings have been consistent with neurocirculatory collapse due to delayed shock

So far there has been no satisfactory hypothesis to explain the origin of postdecompression shock Most of the work on decompression reactions in the past has been the investigation of the formation of gas bubbles in the blood stream and tissues on decompression This has shed no light, however, on the mechanism of postdecompression shock and disappointingly little on the other forms of decompression sickness

Of the existing theories, the most favored one is that it is a biochemical disturbance When this disturbance reaches a threshold value, it sets off a trigger mechanism that initiates the development of secondary shock This type of theory has been proposed to explain the mechanism of traumatic shock It presupposes that apart from the cause, postdecompression shock is the same as any other form of secondary shock and therefore may be regarded as an injury [10 11] The available clinical evidence indicates that the foregoing theory is probably true Because the nature of the trigger mechanism postulated for traumatic shock has not been determined with any degree of certainty, it is not possible to discuss the origin of postdecompression shock any further by analogy

During a study of diet in relation to intestinal pain due to gas formation, the author was led to believe that an increase in the percentage of protein would decrease the other symptoms of decompression sickness At a later period in his study, it appeared that a direct relationship existed between a reduced protein intake and the frequency and severity of postdecompression shock [12] It was suggested that this would explain the rise in incidence of impending or actual collapse in such cases in postwar England Cotes[13] has noted that the incidence of impending or actual collapse taken together over 610 decompression runs at 37,000 feet for one hour after ascent at the standard rate (that is, 3 000 feet per minute to 20 000 feet, 2 000 feet per minute to 30 000 feet, and 1,000 feet per minute to 37 000 feet) was 3 1 per cent for Royal Air Force wartime personnel whereas the incidence of postwar decompression shock for civilians and Royal Air Force personnel was 6.9 per cent.

This belief was supported by the postmortem records of fatal ities that had occurred in America and England up to and includ ing 1952 It had been observed that an obviously fatty liver had been a consistent finding This was demonstrated histolo_ically in five American fatalities described by Haymaker and Davison and two English fatalities described by Sproull and Cotes The available literature does not record the portmortem condition of the liver in the other three known postdecompression deaths However Sproull commenting on the first recorded postflight death in which a fatty liver was demonstrated histologically and in which pulmonary edema was present stated The remark able resemblance of this case to the previous fatality will be noted In 1944 in the previous fatality the postmortem picture was remarkably similar to that of the present case the main difference being the more extensive exudation [in the earlier case] Sproull also mentions the fat embolism found in the fatal cases

In Australia where the protein intake has remained high throughout the period under consideration no serious collapses or deaths have occurred that could be attributed to the effects of decompression and delayed reactions have been rare

THE AUSTRALIAN CASE OF POSTDECOMPRESSION SHOCK

The ne k own e of postdecompr s on shock th t h occur ed n Aust l t most inter sting[1] The subj t h d l ved in Engl nd on a low d p tein d t b for his r act on It w d mon trated by b p y th t the l ve onta n d n ex ve amount of f t Wh n th f t was mov d by d tet treatment and th l v r how to b n rmal by a furth r b op y the ubje t could b re d compre d with t h w ng any ymptom o ign of a tual o imp nd g coll pse

The det ls of th part cul case foll w On 11 M rch 1953 at 2 p m a Lin oln a craft h d b en at 35 000 f t fo 35 m utes when the p l t n ticed th t his se ond pilot had become estl s hi f rehead wa cold and cl mmy but h s kin nd n ils were o mal n colo All members f th c w had obs rved oxygen d ll cco d ng to th in st uct ons fo flight at this ltitud After ten m utes the s cond pil t tated that he did n t f el well and th t h vis on was blur d (The fields were rest cted and he had doubl vis n) H d d not c m *pla n of th b nds Em rgency xygen w s gi en without imp ve* m nt nd h sk d to be fl wn back to the b se At 5 000 fe t he was bett r and app ently was norm l soon after th plane land d At 8 p m he w s n the officers mes when he tated that h felt ick H w then taken to the ho pit l On hospital admiss n he wa dy p c his skin w s cold and cya tic and his blood pre ure w s 95/70 mm Hg H was treated f collapse ob erv d f r four hours and then pe m tted to turn to his quarters It would app r that th s off r suffe ed f om a delay d r acti n and th t the n tur of his c nd t on w n t re ogn zed by the v l n h sp t l st ff There s no record of hi pulse t or of a v neurological examination

The patient was 35 years of age He weighed 192 lbs and was 5 feet 9 inches tall At the annual physical examination on 2 March 1953 his blood pressure was 120/80 mm Hg and the chest roentgenogram was reported as normal He was assessed by the medical examiner as fit for full flying duties

These clinical details were given to me during a routine visit to the hospital concerned Later at my suggestion the patient volunteered to be investigated by the Clinical Research Unit of the Walter and Eliza Hall Institute of Medical Research Royal Melbourne Hospital On admission a provisional diagnosis of fatty liver was made His dietary history was obtained (table 1)

TABLE 1

	A ly f d t		N q m t f m le—m d um t y	
	I E gl nd	In A tr l		
Cal	3 900	3 100	C l	3 000
T t l p	(12%) 121 gm	(18%) 139 gm	T l p	87 gm
A m l p	60 gm	112 gm	A m l p	43 gm
Ca b hydra	(55%) 540 gm	(32%) 250 gm	Carb hyd	–
F	(33%) 143 gm	(50%) 175 gm	F	–
Ir	25 mg	21 mg	Ir	12 mg
C l m	0 7 gm	0 7 gm	C l um	0 8 gm
Ph ph ru	1 7 gm	1 7 gm	Ph ph	1 5 gm
V m A	11 800 I U	6 000 I U	V m A	5 000 I U
Th m	1 4 mg	1 4 mg	Th m	1 2 mg
N	24 mg	30 mg	N	12 mg
R bofl in	1 6 mg	2 0 mg	R b fl	1 8 mg
A b d	160 mg	164 mg	A b d	20 mg

Sour B h M d l A 1950
In m nal un

Discussion

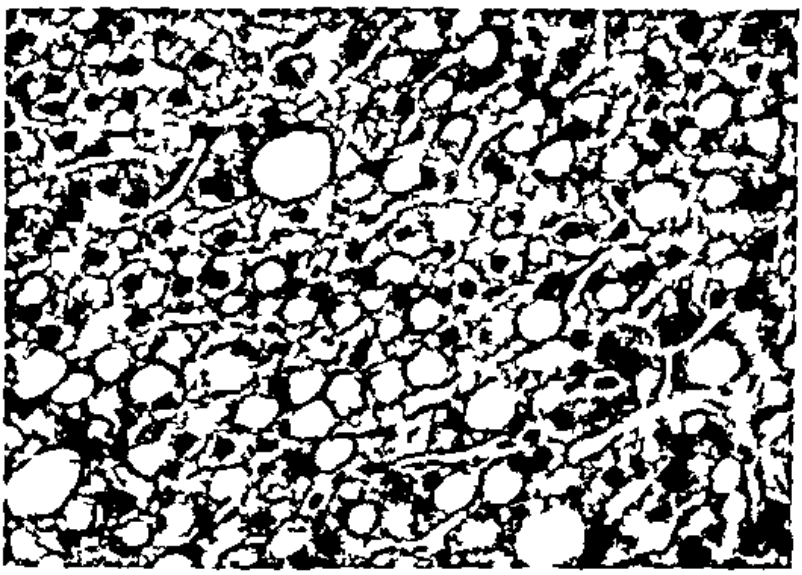
During the three years that the patient was stationed in England his diet was adequate according to the 1950 British Medical Association recommendations for nutrient requirements The percentage of calories derived from carbohydrate, 55 per cent, was high while those derived from fat and protein were 33 per cent and 12 per cent respectively The total protein intake was quite high but only half of this consisted of animal protein The patient consumed very little milk or cheese and few eggs were available Thus, calcium and riboflavin intake was below standard and methionine was not well supplied During his last year in England the patient flew frequently to the Continent where American rations were often available He was able to eat more high grade protein and considerably less carbohydrate

The patient returned to Australia early in 1953 and for six weeks lived at home Since then he has been stationed in South Australia His diet has been very good and contains more protein and fat and less carbohydrate than previously, 18 per cent of the calories are derived from protein and his diet includes twice as much animal protein as it had in England 50 per cent of the

calories are derived from fat and only 32 per cent from carbohydrate His calcium intake is still lower than standard as he does not drink any milk however he consumes more cheese and eggs and the intake of methionine has improved He believes that he averages about six glasses of beer (7 oz) daily He states that this amount does not interfere with his meals His meal pattern is not that of an alcoholic

A liver biopsy (fig 1) was performed on this patient 15 April 1953 The pathologist reported

> The liver biopsy revealed areas of fatty accumulation nter paced with practically no mal live cells However even in some of th se th r wa fine d st ibution of fat The port l r d cles we e normal nd there was no increase n fibrous tissue The f nd gs would be n keeping with th res lving stage of a f tty liver such as s sometimes se n in m lnutrit on However it is not d agnost c of this cond tion



F gur 1 F t l e b p y hou g fatty i f lt t n. (× 250)

The patient was given a diet chart and instructed to return to the hospital in ten weeks He was readmitted on 1 July 1953 The dietitian reported that he had followed the dietary advice given him during his previous visit to the hospital and that his diet had been very good with the lipotropic factors well supplied He had not consumed any alcohol

A second liver biopsy was performed on 1 July Examination of this liver biopsy fragment (fig 2) revealed that the tissue had regained its normal appearance The pathologist reported

> Th l e r hit ctu e s normal there is no increase of cells o fib ous t s e n the portal t ct and the liver cells re r gular nd of no m l z Th fatty ch nge s en previou ly has now completely l d
> Live —no mal

There was good evidence that the fatty change present at the first liver biopsy had resolved completely The patient later was subjected to tests in the decompression chamber up to 37,000 feet and did not show any signs or have any symptoms that could be attributed to decompression sickness He was returned to full flying duties Subsequently, he has not had any recurrence of his trouble

EXPERIMENTAL WORK

To simulate the liver conditions found at postmortem in the fatal cases of postdecompression shock, the author carried out experiments with rats Twelve albino rats were fed on a special

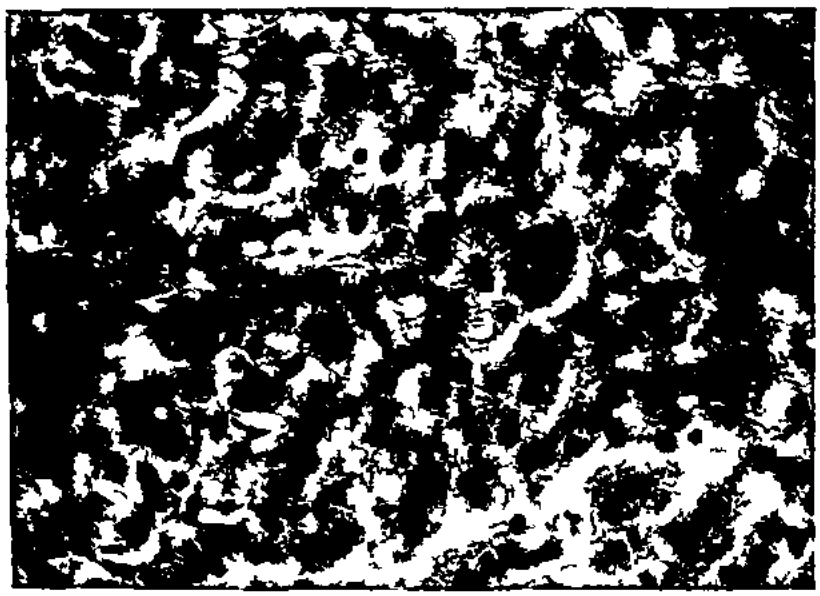


Figure 2. Second liver biopsy showing normal liver (× 250)

diet the constituents of which were selected to keep the lipotrohic content to a minimum This diet contained beef dripping, 40 per cent whole cracked wheat 19 5 per cent rolled oats, 19 5 per cent corn meal, 19 5 per cent and bone meal 1 5 per cent Because of its alipotropic action, small amounts of cystine were included Two rats that had been on this special diet for two months were selected at random and sacrificed, one with ether and the other by trauma Fresh liver from both rats was examined biochemically and specimens of liver, kidney andbrain, as frozen, and paraffin sections from both were examined histologically

In both cases biochemical and histologic examination revealed a moderate degree of fatty infiltration in the liver, 9 9 per cent and 6 9 per cent lipids respectively The fatty change in the liver in both cases was below the required level It was concluded that the diet employed contained unwanted lipotrophic impurities It was necessary to repeat the experiments with a diet free of these factors

of the lesion Extensive pulmonary embolism with fat gives rise to a defin te clin c l pictur the outcome of which s often fatal Obstruction of the pulmona y capillaries interferes with oxygenation of the blood hence cyanosis is a prominent symptom The peripheral blood pressure falls from failure of an adequate amount of blood to r ch the left side of th he rt Damm ng back of the pulm n ry circulat on results in great d l tation and ultim t failure of the right side of the heart

If the right side of the heart is suffici ntly powerful it may force som of the fat emboli through the pulmonary c pillaries into the p ripheral circul t on The re ulta t symptoms are d pendent on the natur and importance of the organ involved Cerebral mbolism is the most common most important and most serious man fe tation This occurs naturally at a time subsequent to the pulmonary man festations and it also is often fatal

Thus from a consider t n of th pathology of fat mbolism it is evident th t the les on w ll manife t itself cl nically in two p incipal w ys c rresp nding to the involvement of the lung and of th brain

3 Should a s ptal defect such as patent fo men oval be p esent t easy to und rsta d with the lung i vol ement and con equ nt rise of p essu e in th right ide of the heart how the fat emb li could p directly to th bra n p oduci g the circul tory and c ntral nerv ous gns a d pyrexi wh ch have been desc b d

4 The lucid p riod b tween the d compres i n and the onset of th symptoms nd sign f postd ompr ssion h ck co ld b con s d ed c nsiste t w th the ch ra t ristic symptom-fre interval mphas zed by Robb Sm th in proven l ssical c s of f t embol sm

THE LUCID INTERVAL

No explanation of the lucid interval has been advanced It is suggested that it may in fact result from the delayed development of rising right intracardiac pressure as a result of the gradual onset of the causative pulmonary edema Until the differential pressure necessary for transcardiac transfer of fat-bearing blood develops fat will not reach the brain by a previously nonfunc tional patent foramen ovale This differential pressure is of course not necessary for fat bearing blood to reach the brain by pulmonary arteriovenous shunts The presence of these shunts has been demonstrated by Tobin and Jariquiey [2]

A third possibility has been suggested by Schneider He considered that the vertebral venous plexus could provide a bypass to the lung by which fat could reach the brain in much the same way as malignancy of breast and pelvis has been shown to metastasize to the cerebrum by this channel

The incidence of persistent but nonfunctional patent foramen ovale is greater than is generally appreciated Hjellberg and his associates state In 20 25 per cent of individuals the fibrous fusion is never complete

DISCUSSION

Adler[3] has given a very detailed review of the clinical and postmortem findings in the seven American fatalities that occurred after exposure to low ambient pressure in decompression chambers prior to 1950. He states:

> In discussing an etiological mechanism of a clinical syndrome it seems to be always necessary however unsatisfactory to suspect that the 'biological individuality' predisposing factors or pre-existing pathology are responsible for some of the unusual reactions of individuals. Because most of the individuals in the military are in the younger age group and have had complete general and special medical examinations one or more times previously it is understandable that very few instances of collapse at altitude should occur since individuals with recognized medical conditions have been eliminated.

> The autopsy data on the seven known deaths associated with ascents to altitude in a low pressure chamber reveal no significant lesions which were chronic or could have been interpreted as being major contributions or predisposing factors to the individuals' exodus.

This latter does not appear to be consistent with the postmortem findings in these cases, because a fatty liver is recorded in five cases and the condition of the liver is not mentioned in the other two cases.

Haymaker and Davison[5] state that, so far as they are aware, fat emboli have not been reported in caisson or diver's sickness, and, more recently, Haymaker and Johnston[7] state, "As far as we are aware, no one has previously looked for fat emboli in decompression to altitude or in diver's sickness or caisson sickness." Fat embolism in caisson sickness is well known in English literature. Muir's *Textbook of Pathology*[2] states that one of the causes of fat embolism is caisson sickness and illustrates an instance of it. Credit, however, is due to Haymaker and Johnston[27] for their painstaking researches in seeking fat emboli in the American deaths. Apart from a postflight fatality in 1952 assumed to be due to postdecompression shock, fat emboli were found in the remaining nine cases.

Of the five known English fatalities fat embolism is recorded in only two.[7] It would appear that it was not sought in the remaining three fatalities, although in these cases there is postmortem evidence to indicate fat embolism was most probable, not only from the general postmortem picture but from such findings as:

> There was cyanosis and congestion of the head and neck and there were a number of petechiae and ecchymoses over the right side of the chest and shoulders. Petechiae were present on the front of the neck and shoulders. Numerous recent sub-endocardial petechial haemorrhages were present on the walls of the left ventricle. There were mild haemorrhages in the lepto-meninges."

of the les on Extensive pulmonary embolism with fat gives rise to a definite clinical picture the outcome of which is often fatal Obstructi n of the pulmonary c p ll ries interfe es with oxygenation of the blood henc cyanosis i a prominent sympt m The peripheral blood pres ure falls f om f ilure of dequate amount of blood to reach the left side of the heart D mmi g back of the pulmona y circulation results in g e t dilatation and ultim te failur of the right ide of the heart

If the ght s d of the heart is ufficie tly powerful it m y force some of the f t mbol thr ugh the pulmon ry c pillar es into th per ph ral circul t on The r sultant ymptom depend t on the n tur nd import nce of the organ n olved Ce eb al embolism i the most common mo t importa t and most er ous m nife t tion Thi occurs naturally at a t me subsequ nt to th pulmonary m n f tation and it lso i often fat l

Thus f om con ide t n of the pathology of f t mbolism t i ev d nt th t the l s on w ll manif t t elf cl cally in two pr ncipal way *corr pond g t the nv lvem nt of th lung and of the b ain*

3 Should s ptal d fe t such a p tent for men ov le be pre ent it is easy to nder ta d w th the lung i volvem nt nd ons qu nt r se f pre ure the ight id of the heart how th f t mbol could p s d tly to th bra n p odu g th rcul to y and ce tr l nerv ou sign nd pyrex wh h hav been d cr b d

4 Th lucid per d b twe n th de omp es n nd the nset of th ympt m a d gn f p std compr ion h ck ould be n d red co stent with the h cte tic ymptom f e nt rv l mpha zed by Robb Sm th in p ve cla sic l s of f t mbol m

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ficient time after the fractures for pulmonary fat embolism to develop and that during this time the intrapulmonary vascular bed was also largely intact

PULMONARY EDEMA

In pulmonary fat embolism, the occlusion of large or small branches of the pulmonary artery or pulmonary capillaries leads inevitably to impairment of the endothelium and its supporting cells with increased endothelial permeability, so that large amounts of fluid may escape into the lungs No sooner has an appreciable amount of the pulmonary circulation been impaired than partial local anoxia begins to develop Infarction or necrosis of pulmonary tissue seldom occurs because, even in extreme pulmonary fat embolism, there is a sufficient degree of blood flow maintained by the bronchial arteries and uninvolved portion of the pulmonary tree to prevent actual cell death However, focal or petechial hemorrhages may appear at regions of vascular occlusion The localized anoxia that is induced leads to an increased permeability of the vascular and alveolar walls so that intravascular fluid escapes into the pulmonary tissues and alveoli This edema may become exceedingly marked

In 1863 Bergmann noted that acute pulmonary edema was often associated with fat embolism and that inadequate emphasis had been placed on this observation Warren[3] states "the occurrence of pulmonary edema in a case of recent trauma should lead to the suspicion of fat embolism" and Masland[4] observes that "the occurrence of pulmonary edema in a case of recent trauma should lead to the suspicion of fat embolism—of special interest is the existence of a period free from symptoms following the trauma in many cases" An article in the *British Medical Journal*[11] on fat embolism states "in the chest the signs are those of acute pulmonary oedema"

Apart from the one English and the one American case for which no literature is available to the author all the remaining cases are known to have shown marked pulmonary edema In this connection the remarks of Burger are of interest He suggests that three forms of the pulmonary type of fat embolism may occur (1) The hyperacute where death occurs in a few seconds (2) The acute in which the symptoms appear immediately after injury and death occurs in hours to days, and (3) The subacute, where a free period intervenes between the trauma and the onset of symptoms The latter two modes of onset have been characteristic of postdecompression shock (fig 3)

OTHER FINDINGS

The high temperatures that have been recorded in fatal cases of postdecompression shock are consistent with the classical findings of Hamig,[2] Warren,[3] and Winkelmann that "a rapid rise in temperature without evidences of pneumonia suggests that the brain has been involved in an embolic process"

It is significant that in all the fatal cases of postdecompression shock, the syndrome has progressed to its termination despite the institution of diverse specific therapeutic measures In classical cases of fat embolism, the failure of therapy has long been recognized

It has been a characteristic in most cases of postdecompression shock, fatal or otherwise that the individuals concerned did not attain altitudes much above 30 000 feet Several authors have commented on this fact Sproull in his description of the first recorded fatal collapse after flight states A secondary question is the riddle of why the fatality occurred in an experienced high altitude flier at such a relatively low altitude

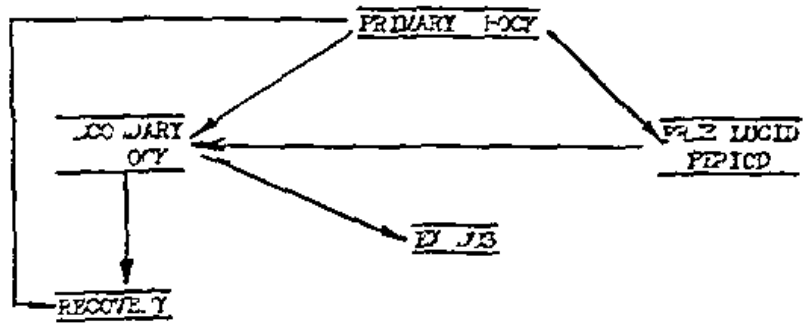


Figure 3 Schematic illustration of decompression shock as

The correlation of these findings with the original demonstration by Armstrong of the formation of nitrogen bubbles in the blood stream beginning at 30 000 feet or at about one quarter atmosphere appears to the author to be most significant This in association with the fact that the degree of decompression experienced by the subjects in most cases discussed strongly supports the author's contention in that fat is liberated into the blood stream as a result of a disruptive generation of gas within fat containing liver cells This close approximation of the two phenomena surely would appear to be beyond the bounds of coincidence

The liver fat Several authors including Warren have stressed that the nature of the fat-producing embolism is of greater importance than the actual quantity Franks elaborating this view stressed the possible importance of fatty acids and suggested that the mortality from fat embolism may be due to the splitting of neutral fats into fatty acids and glycerols by enzymes He cited the result of the experimental injection of unstable fatty acids into rabbits that resulted in rapid death with postmortem evidence of hydrolysis of the neutral fat

Although detailed discussion of this aspect is beyond the scope of this article it is to be noted in passing that fat breakdown normally occurs intracellularly and that perhaps when it occurs extracellularly toxic products are formed

Hepatic fat cells differ from somatic fat cells in that (1) The histologic appearance of the membranes of liver fat cells suggests a greater degree of fragility, and (2) The fat contained in the cells is of a more unsaturated type and has a lower melting point

Of the 15 recorded postdecompression deaths, the first 8 occurred after decompression in decompression chambers, whereas the majority of the remaining cases, actually all but one, followed decompression in actual flight It is postulated that the most significant factor in this change of incidence may be the greater awareness exercised in recent years in the supervision of decompression runs in chambers

SUMMARY

In the past 14 years, 15 deaths have occurred following decompression, 9 of these have been after chamber runs and 6 after actual flight It is suggested that all the fatalities have been due to fat embolism as a result of exposure to low ambient pressure A nonfatal Australian case of postdecompression shock has been investigated and the findings are correlated with the available information on the fatal cases

The hypothesis is advanced that the cause of death in the fatal cases, and the cause of shock in the nonfatal cases was embolization of liver fat to lungs and brain under changed circumstances of differential pressure applied to the liver It is postulated that fat may reach the end arteries of the brain by arteriovenous shunts in the lungs, by a patent foramen ovale or by the vertebral venous plexus The management of the nonfatal Australian case and Australian research into the experimental production of fatty livers in animals and the results of decompression of these is reviewed briefly

REFERENCES

1 Ra t W L P st d mpr h ck. *M d. J Aust* 2 533-534 O t 11 1952
2 D l y E A. A t m d p gre A tr l v 25 y ar *J Aviat on M d.* 25 451 456 O t 1954
3 Adl r H F N ur ur l t y C ll p t Alt t d Sp l Pr j t U S Air F S h l f A t M d Rand lph Air F B T Jun 1950 pp 10-14
4 C t J E D mpr t k w th po t-d c mpr t ll p R A F F P R C R p rt 825 Apr 1953
5 H ym k r W d D C. F t l t lt g f m p ur to im l t d h gh lt tud d mpr ch mb l p th log t dy f 5 ca s *J Neuropath & Exper Neurol* 9 29 59 J 1950
6. H ym k r W J h t A D d D wney V M F t l decompr s ion s ckness duri g jet ir r ft fl ght li t p th l gi al t dy of 2 a es *J Aviat on Med.* 27 2 17 F b 1956
7 M s n J K. A t p th l gy R A F R p rt o l N 1955
8 M s J K d Fry r D I A l t p th logy R A F R port n 2 Apr 1956
9 Spr ull D H Rep rt of f t l ty f ll wing po ure to high ltitude with a w f the p th l g cal sp ct of dec mpr s io si kness RAF Inst Av M d F P R C M m 25 Apr 1951
10 R man J d th r Sy c p l r ct o s during im l ted xpo ur to high lt t d i d ompr s ch mber *War M d.* 4 475-489 N 1943

11 M l d R L I jury tr l rv us y m ul g f m d mp mul d h gh l ud *Ar h Neur l & Psy h at* 59 445 456 Ap 1948
12 R W L I por f R A. A. F 1949-1953
13 C J E N d f f ll p R A. F d mpr h mb RAF *Inst A M d.* F P R C. M m 33 M 1952
14 Wh d M G D l pm f d ffus ut t l f br l f t *Aust alas an Ann. M d.* 5 294 304 N 1956.
15 Hartr ft W S. d R d J H P h g f rrtho prod d by h l d f y p f l p d f m f y h p cy t b l ary d l y *Am. J Path* 27 951 989 N D 1951
16 Gly L E d H m w rth H P M h p f l ig f d xp m l p od n. *J Path & Bact* 56 297 305 July 1944
17 B t C. H H rtr f W S L C. C d Rid ut J H L da g p d d by f d g l h l ug d p t by h l *Brit M J* 2 1001 1006 N 5 1949
18 B t C H H rtr f W S L C C R d ut J H Eff f d ary p l p tr p f d e- l m t l h p l p d d h d tr b n. *Brit M J* 1 1439-1444 Jun 18 1955
19 Harr R L. F mboli m *J A. M. A.* 105 1013-1016 Sep 28 1935
20 H ll L Cm on S kn and th Pby l gy f uork Compr d Ar Edward Ar ld L d Engl 1912 pp 164 177
21. G h I H wkin G E d R bun E N T ue and lar bubbl f d mp f m high p ur m ph —c rr l f pe f gr ty w h m rph l g al h g *J C ll & Comp Physi l* 24 35 70 A g 1944
22 V B M S g f f f t mb li m *Arch Surg* 23 426-465 S p 1931
23 R bb-Smi h A. H T Pulmonary f mb l m *Lan t* 1 135-141 F b 1941
24 T b C. E d Zat qui y M O Art us bun bum lung *Proc S Exper B l. & M d.* 75 827 829 D 1950
25 Sch d R C F mb l m p bl m diff l d g f b al m *J Neurosurg* 9 1 14 J 1952
26 Kj llb g S. R Man h m E Rudh U d J B *Diagnosi f Congenital H ar Di as* Y ar Book P bl h Ch g Ill 1955 p 24
27 H ym k W d J h A D P th l y f d mp k I *Coll t d Paper of th Arm d F Institut f Pathol gy* A F I P W h gt D C. 1955 pp 285 306
28 M ir R *T tbook f Path l gy* 5 h d n. W ll m & W lk C mp dy B l mor Md 1941 pp 41 42
29 Warthi A. S. T um l pem and f tty mb l m. *Internat Clin* 4 171 227 D 1913
30 Warr S F mb l m *Am. J Path* 22 69 87 J 1946
31 F mb l m. *Brit M. J* 2 897 J 19 1954
32 B d G Dr F ll F tt mb l m punkt F mig Bl g d H ut *Dts h Z. Ch* 112 194-205 O 1911
33 Bus h F U b F tt mb l *V rch w A h* 35 321 358 F b 1866
34 Corl tt C. E C b l f mboli m p rt w h ry *M J Aust al* 1 229-234 Mar 7 1925
35 K ll H D tr m h F mb li *Deut h Zt h f Ch* 231 97 186 1931
36 Wh k J C. T m f mbol m port f 2 w h ry *Arch Surg* 39 182-189 Aug 1939
37 W l J V d S l bury C. V F mb l m wa urg ry *Brit J Surg* 31 384 392 Ap 1944
38 Arm tr g J A Fry D I d St w rt W K d Wh tt gh m H E In pr f jur Com af d pe me l pp h *Lanc t* 1 1135 1144 Jun 4 1955
39 Robb-Sm h A. H T H A. H R ll D d G nf ld G G D us f mb l m d b *Proc R y Soc Med* 34 639-656 A g 1941
40 B gm E. B Tur L h d F t mb l K l b U t t Dorp E J Kar w Dorp G ma y 1863 p 41
41 Burg r L. D B d ut ng d F mb l fur d Dr g chirurg *M d. Kl mk* 11 996-1001 Sep 5 1915

PRINCIPLES AND PRACTICE OF TOPICAL ANTIMICROBIAL THERAPY

EDWIN J PULASKI *C I I MC USA*

THE most notable developments of the past decade in antimicrobial therapy came about as a result of their systemic need and use Topical medications followed with varying degrees of success and general acceptance Sufficient knowledge and experience has now accumulated so that local therapy may be used along rational lines This development has been due in part to the introduction of new and important antimicrobial agents More importantly it is the result of critical controlled studies pointing to the more intelligent use of these and of older drugs [1] Principles of antimicrobial therapy and as a logical extension their application to treatment as well as prevention of infections of wounds skin and mucous membranes are discussed here

PRINCIPLES

If topical antibiotic therapy is to succeed the following factors in the wound detrimental to antibiotic activity must be considered the type of underlying pathologic lesion biologic materials which inactivate the drug unfavorable pH the low metabolic turnover of the micro organisms and the intracellular location of the micro-organisms In addition the allergenic potentialities of the antibiotic or the vehicle which delivers it may be the limiting factor For such therapy to succeed certain conditions must be fulfilled and it is easy to illustrate failure due to lack of their observance on the part of the physician The chief of these principles are the following Accurate etiologic diagnosis accessible lesion sound surgery and competent nursing care drug sensitive micro-organisms and a nonallergenic noncytotoxic preparation

Accurate Diagn sis The important considerations in diagnosis are whether infection is present whether it is primary or secondary and whether it is superficial or deep

Diagnosis of infection initially is clinical and is based on etiologic probabilities and the therapeutic agent is selected accordingly If the lesion is superficial treatment is usually

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effective Nevertheless, laboratory studies at the beginning of empiric therapy are desirable, even mandatory, for staphylococcal and mixed and deep infections

It must be appreciated that cultures of wound exudates positive for bacteria do not necessarily indicate bacterial disease The first problem is clearly to distinguish between primary and secondary infections

Primary infection	Secondary infection
Involves normal tissues	Involves diseased tissues
Usually is monobacterial	Pure or mixed infection
Usually is acute	Acute or chronic
Diagnosis is readily made	Differential diagnosis is complex
Early treatment is curative	Result of treatment is unpredictable

Primary infections originate in previously healthy tissues They usually are incited by a single species of pathogenic microorganism Early adequate antimicrobial therapy and good nursing care effect a prompt and complete cure in most instances

Secondary infection develops in a variety of pre existing disturbances such as eczemas eruptions caused by drugs, insect bites, sinuses and fistulas, wounds burns, and ulcers The offending micro-organisms when rapidly proliferating play a prominent role in protracting or intensifying it Early recognition is not always easy It is the host response which differentiates contamination from infection If a stained smear preparation of the exudate reveals neutrophils and bacteria a diagnosis of infection is tenable If the infection is deep or chronic, diagnosis may require culture or biopsy, with appropriate histologic, bacteriologic, and mycotic examinations Treatment of the infection itself does not necessarily result in cure Bacteriologic control may bring about improvement although there is still the underlying disease On theoretical grounds an acute lesion should respond better to all inclusive local therapy than a chronic lesion, and actually this usually happens

Accessible Lesion Topica therapy can succeed only in superficial or mucosal lesions or in body cavities where the drug can flood the whole of the infected area If deep penetration has occurred, or if the lesion, such as a 50 per cent body surface burn, is too extensive, the systemic route is preferable to the topical Other causes of failure include loculations within cavities fibrosis which impedes free permeation of drugs as in sinuses fistulas, and other old exudative lesions and the presence of sloughs, necrosed bone, or other nonviable tissues or foreign bodies Undrained or inadequately drained and debrided infections are unsuitable for topical therapy

Sound Surgery Good Nursing Care The chief aim of topical therapy is to secure persistence of effect with repeated but widely spaced applications This aim is achieved only by pro-

viding adequate contact between drug and microbe as well as providing optimal conditions for wound repair Crusts must be removed, adequate drainage provided and devitalized tissues and foreign bodies removed according to the dictates of sound surgical principles Suitable dressings are applied as indicated

Of considerable interest and concern is the emergence, especially in the hospital environment, of micro-organisms resistant to several antibiotics Indiscriminate, casual and prolonged topical use of antibiotics may be an important contributory factor Inasmuch as lesions suitable for topical therapy are often open lesions carelessness in dressings technics and in disposal of infected dressings invites widespread environmental dissemination as well as colonization of skin and mucous membranes of patients and personnel It is of course possible by means of a well planned program to reduce this environmental contamination The substitution of newer antibiotics for the older ones does not solve the problem of cross infections

Suitable Topical Antibiotics Suitable antimicrobials are bacitracin chloramphenicol neomycin polymixin and tetracycline Antimycotic agents are nystatin and amphotericin The majority of superficial pyogenic infections will respond to a single antimicrobial preparation There has been a great trend on the part of pharmaceutical manufacturers to develop combinations of of drugs for the treatment of local resistant infections Bacteriologic studies have revealed that these prefabricated combinations are seldom the selections necessary because refractory strains present a variety of resistance patterns

The reactions to topical antibiotics are in general similar to those appearing after the use of systemic antibiotics These reactions include chiefly sensitivity and the development of local organism resistance The development of damage to viscera or particularly to liver kidneys and blood is not too likely an occurrence even when used over extensive surface areas

One popular phase of combined topical antibiotics today is the use of various corticosteroids in combination with an antibiotic especially neomycin and less commonly chloramphenicol and nystatin Again in spite of the popular use of these combinations there are surprisingly few good controlled studies of the bacteriology and mycology of such lesions or even the actual role of topical corticosteroid on the organism This is then another neglected field in the study of the mechanism of topical corticosteroid activity There is however, increasing use of corticosteroids combined with chemotherapeutic agents for superficial local infections The reasoning is that one has greater security of conscience if not knowledge when this combination is used in local allergic reactions whenever the skin is subject to actual or potential local infection When there is local infection or when it threatens, certainly corticosteroids and chemotherapeutic agents can be used in effective combina

tion It is interesting nevertheless that in local eczematous reactions, produced by topical applications of neomycin, the protective influence of the associated corticosteroids is nil, for the inflammatory allergic reaction is too severe for the local corticosteroid to be influential

Synthetic Topical Chemotherapeutic Agents Some of the commonly used synthetics are acridines, monoxychlorosene (Clorpactin WCS 90), gentian violet, hexachlorophenes, iodophors, nitrofurans, quaternaries, sulfacetamide, chlorquinaldol (Sterosan), iodochlorhydroxquin (Vioform), bismuth tribromphenate (Xeroform), zinc peroxide, and Burrow's solution

It is well to remember that, except perhaps in superficial monilial infections and in superficial infections of the Pseudomonas group, certain topical chemotherapeutic agents which remain effective in the presence of blood, body fluid and pus do act as effectively as topical antibiotics The more important of these chemical compounds include chlorquinaldol, iodochlorhydroxyquin, Burrow's solution, and Furacin (brand of nitrofurazone) A variety of chemical agents also are available for topical use in superficial fungal infections The real value of topical chemotherapeutic agents is that they avoid sensitization of the patient to antibiotics which may be required later for systemic therapy in much more significant infections Moreover, the use of chemical agents obviously prevents the development of organism resistance to the antibiotics This is of considerable concern now in hospital infections, cross infections of wounds, and the intestinal flora of carriers

PRINCIPAL INDICATIONS FOR TOPICAL ANTIMICROBIAL THERAPY

The principal indications for topical antimicrobial therapy are (1) superficial drug susceptible pyogenic, Pseudomonas, yeast or mycotic infections (2) infections of the tracheobronchial tree, pleura, and joints, and (3) prevention of local infections

Superficial Drug Susceptible Pyogenic Pseudomonas Yeast or Mycotic Infections Nonsensitizing synthetic chemotherapeutic agents are substituted for antibiotics for staphylococcal and streptococcal infections where such agents are of proven clinical effectiveness Antibiotic therapy is required in the Pseudomonas and for local proved monilial and mycotic infections Antibiotic therapy is reserved for pyogenic infections when bacteriologic studies show that the organism is sensitive to the antibiotic and topical chemotherapy has failed

Infections of the Tracheobronchial Tree Pleura and Joints These are preferably treated with a suitable antibiotic Mucosal lesions such as thrush or intraenteric infections may be treated with either antibiotic or chemotherapeutic agent, whichever is more effective or available

Prevention Prevention of local infection perhaps may be the most important of all forms of local antimicrobial therapy As

examples prevention of ophthalmia neonatorum aerosol sprays for infections of the tracheobronchial tree clearing of freshly contaminated burn wounds of hemolytic streptococci protection of donor sites from infection from the burn wound and prevention of anastomotic leaks following colon surgery by preoperative suppression of the flora of the large bowel have been repeatedly demonstrated Applications of solutions of antibiotics to wound surfaces following surgical intervention in contaminated fields now also shows promise of being highly efficacious in prevention of po toperative wound suppurations Postoperative prevention of dissemination of cancer cells by means of topical chemotherapy is now in the stage of clinical investigation No such applications however can substitute for gentle deft surgery and avoidance of wound healing faults and superinfections Topical therapy without justification or design is ritualistic and what drug is used does not matter a great deal

SUMMARY

Topical antibacterial therapy in order to be successful is no easy matter For such therapy to succeed certain conditions must be fulfilled The chief of these principles are accurate diagnosis accessible lesion sound surgery and nursing care drug sensitive microbes and the diligent use of a nonallergic noncytotoxic preparation Some important indications for topical antimicrobial therapy are outlined

REFERENCES

1 Gar od L P P pl d p tu f l c l h m h py *Brit M Bull* 4 275 80 1946
2 How C W d W ggl w rth W C C rt l f f tu oc t d w h bl t rt l d *Surg Gyne & Ob t* 96 553-563 M y 1953
3 P l k E J *Surgic l Inf ct ns Pr phylaxis T atment Antibiotic Ther py* Charl C Th m P bl h Sp gf ld Ill 1954 Ch pt 1
4 L db g N C F R E K hn L R Am p h W H d Art C P I f ct bur l ti f l l f bl mph l intm nt d fur l bl dr g g l g urf f ll w g xt f ll thick burn *Surg Gyne & Ob t* 100 219-231 F b 1955
5 M g W I d P ig A. Elf f l l tub t h py p urviv l f w d b ct *Antib otic & Chemother* 5 423-432 A g 1955
6 V ugh A. M Gl W J Martin G A an C M d C rt J A N w t b t mb f t p l urg ry p lm ary p rt *Postg ad Med.* 21 255-258 Mar 1957

We doct rs while w st ll ret in th t measure of contr l o er our p acti allowed us by the in pired popular cl mo f p tients to be dosed must m ke th de sion wh ther to g ve up ll along the l e and merely hand out the p lls or n t No indiv dual can *d tat* that decision but I shall h tt mpt to *nflu n e* it by s ying this mu h All dr gs— e th v y b st nd le st noxious of them— re psy holog c lly o ph cally p tent ally tox c gents and no e of them h ld b d unless s ch u e can t asonably be a oid d—I y B km M t All th D ugs Be U d? ll *in M d / /* / March 1959

ADMINISTRATION OF INTRAVENOUS FAT EMULSION TO SURGICAL PATIENTS

EDWARD R NELL *Captain* MC USN
MARVIN L GERBER *Captain* MC USN

PATIENTS in whom normal alimentation has been interrupted by disease or by surgery undergo rapid depletion of the body storage depots of fat and protein Surgeons, as well as other clinicians have recognized for many years the need of a high caloric material which could be administered parenterally to such patients Loss of body weight occurs despite continuous maximal administration of solutions of carbohydrates and protein hydrolysates The absolute amount of such caloric sources that may be safely administered during any 24 hour period is limited to an inadequate level by the considerable amount of water that must accompany them as a vehicle Fat, because of its high caloric content per unit of weight is the obvious ideal substance to provide a maximum of calories with a minimum volume of the necessary aqueous vehicle

Clinical and laboratory investigators have repeatedly attempted to find a practical solution to this problem for the past 40 years Failure was consistently experienced because of the unacceptably high incidence of serious systemic reactions caused by toxicity of the emulsifying agents used Recent work has resulted in the elimination of the toxic fractions of suitable emulsifiers and in the synthesis of nonionic nonhemolytic coemulsifiers Subsequent laboratory and clinical testing of lipid emulsions containing such nontoxic emulsifying agents determined that they could be safely stored and used for short periods of time under clinical conditions

This study was initiated to afford the surgical staff of this hospital experience in the administration of intravenous fat to surgical patients A commercially available lipid emulsion Lipomul I V * was chosen which had already received adequate laboratory testing and trials and limited clinical trial It contains fat particles the majority of which are less than 1 micron in diameter[1] It may be successfully stored for one year under

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F m U S N l H p tal O kla d C l f
Furn h d by th Upj h C mp y K l mazoo M ch. Lipomul I V i a l bl
mme ally in 600-ml st le bottl tai ng 500 ml of 15 per c t f t emul

refrigeration The presence of visible oil droplets however means that the emulsion has broken down and should not be used It was supplied in bottles containing 600 ml representing a caloric content of 960

The indications for its use exist whenever parenteral alimentation in whole or in part must be relied upon as a source of calories It represents a high caloric source for use in conjunction with glucose amino acids electrolytes and vitamins However it should not be mixed with them or with blood transfusions or given simultaneously or through the same tubing because the lipid emulsion may be broken down It makes it possible for the patient to conserve nitrogen and in some cases may enable the surgeon to convert a negative to a positive nitrogen balance It is not usually necessary in the immediate postoperative period of course

During the past two years 187 units of Lipomul of 600 ml each were administered to 69 surgical patients of all types and all ages No adequate biochemical studies were performed on the majority of these cases The temperature pulse blood pressure and subjective reactions were followed and recorded however Thirty five of the patients received only one bottle each Of the remaining 34 patients who received more than 1 unit 4 received more than 10 units each

TABLE 1 O *ll d / d // z /*
*L p m l l *

R on	S g and Symp m	I d
M j		
Imm d t	U	(2)
	Ch p	(1) 3
D l y d	Ch ll	4
M	F (2 F mo)	15
	O h (us d v m t g)	2
T l		24

The clinical investigators in this field[3] classified side effects from the administration of such lipid infusions as major[4] and minor Those of major character may be of the immediate or colloid type and consist principally of chest or back pain dyspnea flushing or urticaria usually manifest after only a few milliliters have been administered The delayed major reaction is a chill usually occurring during infusion but may be delayed a few hours The minor reactions usually consist of mild temporary fever or of such symptoms as nausea vomiting abdominal discomfort headache and dizziness There may be variations in blood pres

sure or pulse The over-all incidence of side effects in our series is shown in table 1

Mild temporary fever was obviously the most common side effect and perhaps merits closer scrutiny Accordingly the cases have been broken down into those with 1 5°F temperature elevation, of which there were 24, and those with more than 2 0°F elevation totaling 15 cases The fever characteristically appeared toward the end of the infusion and disappeared after a few hours

CASE REPORTS

Data on the four patients who received more than 10 units of Lipomul each follow

Case 1 This 48 year old woman weighed about 80 pounds and she had the clinical picture of cachexia at the time a bowel resection was performed for regional enteritis She received 16 bottles of Lipomul intravenously over a 2 month period most of it being administered during the postoperative period She experienced a transient chill at the termination of the second unit of Lipomul with a temperature elevation of 1 2°F On three other occasions there were temperature elevations of 2 F or more but without chills or other side effects It is our belief that the preoperative preparation and postoperative care were materially enhanced by the use of 16 units of intravenous fat totaling 15 360 calories

Case 2 This 73 year-old man received 11 units of Lipomul I V over a period of 11 days Resection of the distal esophagus and cardia was performed for ulcerative esophagitis and stricture secondary to hiatal hernia and peptic esophagitis He experienced transitory chest pain about two hours after the beginning of the second unit and had a concomitant tachycardia of 130 with blood pressure of 160/100 mm Hg The infusion was temporarily discontinued then cautiously restarted after about an hour and a half at which time the pulse rate was 110 per minute and the blood pressure 140/100 mm Hg No further side effect appeared Pyrexia of 2 2 F with the ninth unit and 2 4 F with the eleventh was recorded and was manifest at the time each infusion was completed

Case 3 This 43 year old man received 12 units of Lipomul I V over a 3 month period but 9 of them were given during a 12 day period A gastric resection for intractable duodenal ulcer was carried out followed about 2 months later by a laparotomy for intestinal obstruction The patient had a temperature elevation of 2 2°F during administration of the first bottle and toward the close of the sixth

Case 4 This 29 year-old woman received 11 units of Lipomul I V over a 6 month period the first 4 over a period of 2 weeks and the last 7 over another period of 2 weeks She underwent several major surgical procedures during the 6 month period all directed toward the cor-

of chronic pancreatitis One m jor reaction urticaria was experienced immediately after completion of the second unit with associated tachycardi of 122 which was relieved immediately by administration of a st ndard antihistamine The pat ent had a transient chill without fever about 30 minutes after completion of the third unit

SUMMARY

One hundred and eighty seven units of lipid emulsion (Lipomul I V) were given by intravenous infusion to 69 patients on the surgical service of this hospital No significant complication was attributed to its administration This experience with intravenously administered fat emulsion indicates that the immediate reactions are of a mild nature and not sufficiently severe to preclude its clinical utilization over limited periods of time

REFERENCES

1 *L pomul I V (Upj hn) 11 612 Seri* d M y 31 1957 Th Upj h C m-p y K l m oo Mi h 1957

2 Sm th M E Sympo m tr f m l Cl l tud us f *M tabol sm* 6 P 2 717 722 N 1957

3 P F W B A U M d l E E S l y C J d T pp l O H Symp m tr f t m l Eff f tep d i fus f f t m l urg l pa *M t bol sm* 6 Par 2 758 765 N 1957

4 L S M Upj h H L d She hy T W Sympo um tr f m l Tw f ll w ng l g m fus f l g m f tr f m l *M t bolism* 6 P 2 807 814 N 1957

5 B zi R C. D d N W S tma L J d W lki C. F J Sym-po m us f m l Ob f f m l m *M t b l sm* 6 P 2 703 716 N 1957

6 W k D M Sy po m f m l Cl l h m l h m l g d m h ng mpany ng p d us dm tr f f mul m *M tabol sm* 6 P t 2 785 806 N 1957

SPOILED STATISTICS

One of our greatest faults a stati ticians is to dem nd e pert inform tion from tho e who cann t possibly furnish a true an wer except by accident If our unf rtunate in formant happens to be ho est and dmits he does not know we insi t on his making a guess which he eventually does Our mo t haunting fe r is that w may ha e to cl ssify a cause of death as nknown or ill defined —rath r than this we would ccept almost any random c njecture Then we proceed to roll this speculat on into one ball with in f rm t on secured at highly reliable levels and push the ult ng mess into ne p geonhol apparently with the d that the certainty of part of the number will permeate th r m nde It i something like mak g an omelet w th egg o ly half f which are sp led —Hugo M ench Figur s F c and Fa cy Figures *Am ican J urnal of Publ H alth* F bru ry 1959

ADAPTABILITY SCREENING OF FLYING PERSONNEL

Preliminary Analysis and Validation of Criteria of Adaptability to Military Flying

ALBERT L KUBALA *Ph D*

THIS report is one of a series of research reports on the development of adaptability screening of flying personnel It is related to that part of this research program which is concerned with the development and evaluation of criteria used for test validation The over all experimental design of the research program has been described in earlier reports [1-3] The data used in this study were taken from material systematically collected since 1949 as an integral part of the research program

The goal of all selection research is the procurement of men qualified to undertake the assigned tasks Inherent in this goal is the prediction of ultimate success of the applicants for the task However, except for the simplest tasks which require largely psychomotor skills or other special abilities one rarely has available anything which even approaches a measure of ultimate success which can be used as a criterion to develop and evaluate his tests In most research the ultimate criterion is a useful concept but a practical impossibility

The term "ultimate implies that the criterion score is an error less reflection of the final over all value of the person in his occupation Even if it were possible to compile measures of ultimate criteria, they would hardly be feasible for use from a practical standpoint for their maturity would require an extended period of time, and the processing and synthesizing of vast amounts of data As a result it is necessary to accept some substitute some measure which is a good approximation to the ultimate criterion These substitute measures have been called intermediate" criteria by Thorndike [4]

In his discussion of intermediate criteria Thorndike listed several necessary attributes of criteria These are (1) reliability

Fr m Dep rtm f M d c l P ychology U S Air F r Sch l of A t Medrci Randolph Air F rce B s Te s R p rt 58 121 Dr K bal now t T xas Woman U er ty De t T x

(2) freedom from bias (3) practicality that is availability with reasonable expenditure of time and effort and (4) relevance to the ultimate criterion It is usually possible to determine or estimate the reliability of such criteria and by careful selection to make them relatively free from bias The practicality is usually administratively determined but the investigator is always left with the question of relevance

Actually the question of relevance of the intermediate criteria is a question of the relevance of the characteristics they reflect If an intermediate criterion is reliable it definitely measures something but this does not guarantee that the characteristic or characteristics reflected are relevant to ultimate success on the job If they are not relevant predictor tests developed with these criteria cannot be valid predictors of later success Most investigators are convinced that both personality characteristics and aptitudes or abilities are related to successful job performance but in the case of the former they have been able to supply little scientific evidence to support their beliefs Severin reporting data tabulated from a vast number of studies in industry and the armed services found that the median validity of personality tests for the prediction of performance criteria was only 0 15 Data on personality tests tabulated from Guilford and Lacey yielded a median validity of 0 07 for the prediction of graduation elimination in primary pilot training On the other hand the results with aptitude tests have been more encouraging Severin reported a median validity of 0 25 with aptitude measures while validities of 0 50 and above have been consistently reported for pilot stanine a flying aptitude index with the graduation elimination criterion

These results with predictor tests have led some to question the relevance of personality characteristics as determiners of job related behavior Others not discouraged by the poor results have proposed several explanations Most of their arguments concern either the requirements of the task itself or the relevance of the intermediate criterion measures used in test development If the task under study does not require a particular trait (for example the ability to adapt to severe environmental stresses and pressures) then measures of this trait should not be expected to be predictive Likewise if the trait is required for successful performance but the trait is not reflected in the criteria used in test development then again the test should not be expected to be predictive The task of the psychologist therefore is to discover what characteristics are important determiners of success and to develop intermediate criteria which reflect these characteristics

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stages thereby "purifying" the earlier criter
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1 What characteristics of behav or and perfo mance of student pilots are reflected n the training level m sures?

2 Wh ch of the characteristics reflected in the early measures ar predictive of success n l ter career stages?

3 Are tests developed with the d of the arly me sures able to predict a lat r criterion uccessfully?

4 Wh t diff rences in the relative import nce of var ou personal characteristics are found at different stages in the career sequence?

Questions 3 and 4 are most pertinent to the primary research objective that of evaluating empirically the usefulness of existing criteria questions 1 and 2 are designed to provide information of greater value for further research and development of criterion measures

An outline description of the actual procedures followed and the rationale behind each step in terms of the information desired are given below

PROCEDURES

Int rnal Analys s of Training Lev l Cr t ria

A total of 41 linearly independent criterion and reference meas ures of aptitude performance and adaptability were available for analysis These data were factor analyzed in an attempt to determine what common psychologic factors were being measured and which specific variables were the best measures of each of these factors Inferences from this analysis provided information relative to question 1

Validation of Training Lev l Criter a

Factor scores were computed for each factor represented in the data These composite scores should be relatively pure measures of each factor and should also be more reliable than any of the individual criterion measures The factor scores were correlated with a posttraining criterion of effectiveness The magnitudes and relative sizes of these relationships yielded an estimate of the importance of each of the characteristics represented by the factors in determining posttraining success Within the limitations imposed by any inadequacies of the post training criterion measure these data were pertinent to question 2

Comparison of Adapt bility a d Aptitude Measur s

Comparison of two types of measures for two career stages was used to test a specific hypothesis proposed by Sells which is inherent in question 4 In developing a rationale for the adapt ability screening program Sells criticized the use of a pass fail in training as a criterion for selection measures based on personality characteristics His criticism was supported with data from an analysis by Guilford in which it was shown that

nearly all of the predictable variance in the graduation elimination criterion was attributable to aptitude or ability factors Sells further hypothesized that criterion standing in later career stages would be more strongly influenced by personality factors He reasoned that learning to fly was naturally heavily dependent upon aptitudes as is any learning task, but after training, the ability to handle responsibilities, frustrations, and increased personal hazards would be of greater relative importance The deduction follows that the training level adaptability criteria, and therefore the screening devices developed with these criteria, might be only marginally related to training outcome, but should have significant relationships with posttraining criteria In the present study it was predicted that a measure of *aptitude* for flying would be significantly better than adaptability measures in differentiating success and failure in training, but that the effectiveness of the adaptability measures in predicting the posttraining criterion would be greatly increased relative to the aptitude measure

Similar reasoning suggested the additional hypothesis that early measures of adaptability would be just as highly related as early measures of flying *proficiency* to a posttraining criterion reflecting subjects global posttraining adjustment

To evaluate these hypotheses the magnitude of the relation ship between a composite aptitude performance factor score and the posttraining criterion was compared with that found between a composite adaptability factor score and the posttraining cri terion

The standard Air Force flying aptitude index from the aircrew classification battery and three experimental adaptability screen ing tests were next compared with respect to both pass fail status in training and the posttraining criterion

Although these comparisons were designed primarily to pro vide data relative to question 4, the comparison of screening tests provided data relative to question 3 since the validities of the adaptability tests for the posttraining criterion can be studied independently of the comparison to determine whether test measures developed with the early criteria are sufficiently sensitive to predict differences in criterion standing on the later criterion measure

SAMPLE

The sample in this study consisted of 1 664 men in flight training at Randolph Air Force Base during the period 1949 1951 All of these entered the flying training program as aviation cadets were between the ages of 20 and 27 at the time of entry, and most had completed at least two years of college The comparison of the screening tests with pass fail status was based on data

from all 1 664 cases The factor analysis and validation study of training level criteria were made on a subsample of 666 cases consisting of graduates of the program Smaller samples on whom appropriate data were available were drawn from the group of 666 graduates for the comparisons of the screening tests with the follow up criterion

VARIABLES

Training Level Measures

The training level measures investigated in the present study may be divided into two classes objective variables and rating variables In turn the objective measures may be subdivided into those referring to structured assessments of training performance uch as flying or academic grades those representing aptitude for training and those which are descriptive of the person

Similarly the rating measures may be subdivided into those representing training achievement and those indicative of a person s adaptability Here a distinction must be made between ratings by peers or superiors and ratings by experts For example an evaluation by a tactical instructor of a person s military aptitude would be considered as a rating by an expert because the instructor is uniquely trained and competent to make such an evaluation On the other hand if the same instructor were to evaluate the flying aptitude of a person this would be considered as a rating by a superior because the instructor is not specifically trained to make such an evaluation

Using this schema all of the variables may be assigned to one of the categories The placement of each variable is indicated in table 1 A complete description of the variables is presented on page 822 together with the rationale for the classification indicated in table 1

Table 1 also includes three global indexes of adaptability Adjustment Group (AG) Adjustment Rating (AR) and Actuarial Adjustment Rating (AAR) These are described on page 825 Because they were derived in part from other training level measures they could not be included in the factor analysis

Posttraining Criterion

The posttraining criterion data were obtained from the Air Force Form 66 Officers Warrant Officers and Flight Officer s Qualification Record and supplemental records This form contains a chronologic record of information that administrative authorities believe is pertinent to the career of the Air Force officer Abstracts of these records were obtained by research teams from the Department of Medical Psychology USAF School of Aviation Medicine who visited the Military Personnel

TABLE 1 *Classification of training level measures*

	Performance	Aptitude	Descriptive	Adaptability
Objective measures	Hours flown solo Academic average Flying grade Number of failing flying grades	Pilot stanine Officer quality stanine	Age Previous flying experience	Number of demerits
Ratings by experts				MAR tactical dept 23 ratings by psychologists Adjustment group (AG) Adjustment rating (AR) Actuarial adjustment rating (AAR)
By peers superiors		Flying aptitude rating by psychologist		Instructor rating tactical dept Instructor rating weather dept Instructor rating flying dept MAR classmates MAR upperclass MAR academic dept MAR flying dept

MAR refers to Military Aptitude Rating

Records Center St Louis and the Office of the Air Adjutant General Washington D C Only those data which logically seemed related to posttraining adaptability and proficiency were recorded From among these six categories of information were subsequently utilized to develop a criterion score These were (1) military schools successfully completed (2) decorations received (3) promotions received (4) number and kind of aircraft qualifications (5) number and kind of command positions held and (6) final disposition (that is whether discharged killed in action still in service et cetera) Weights were assigned on an a priori basis for accomplishments within each category and a final criterion score was obtained by summing the weighted scores Details of the weighting system developed for this criterion have been described by Trites and I ubala and are summarized in table 2

Select Tests

The three adaptability selection tests evaluated in this study were the Cornell index the Cornell word form and the personal inventory The scoring keys used were those developed through research at the School of Aviation Medicine rather than the original keys published by the authors The research on the Cornell index has been described by Barry and Paynor [1] research on the Cornell word form has been reported by Barry Sells and Trites and the research on the personal inventory has been published by Trites Each of these scoring keys has been validated against the training level criteria in a number of samples since the original findings were reported The objective aptitude index of pilot stanine was used for comparison with the adaptability screening tests

DESCRIPTION OF TRAINING LEVEL CRITERIA

The training level criterion measures are described in outline form below Classification of these measures follows that given in table 1

Scores on most of the measures are given in terms of scales Goodness on the measure generally is indicated by a high score In those cases where this was not true the scales were reversed prior to analysis These are indicated by an asterisk preceeding their description

Obj t M

A Pe form nce

1 Hour fl wn solo The total hours of lo time flown during training

2 Academ c av rage A normali d nine-point c re de ived fr m fi al nume cal a dem c g ade Good gr des receiv d a high e o the c l

T BLE 2 *g* *pl* *d* *or* *b* *f rm 6*

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10		Con t d f H				
4		D hed S rv Cr l ar			F md or d d	
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2	In uct or l hool US FIT (ll)	B &c ld d L f	1 L 5 mo C 19- d L C C lon l	4 mos are S or p lot lot 2 g	Fl omdr E Ope f Ar f C	ned 60 or mor month se
1	Ad mad p l T or f ool ot l d	A l mme st bl	1 L 9-12 mon C or	2 or 3 f P lot nd	raft mdr l pl g er l pp y dmu on p f d ut	d 60 mo h h ll d ac on
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						G ne al court J or l har

annual ex eps numbe aircraf nal fue

3 Fly ng grade A norm lized nine point score derived from final numeric l flying grad s Good g ades received a high score o the cale

4 Number of f iling flyi g grades The total number of flights f led during training Poor perfo manc received a higher score

B Aptitude

1 P lot stanin A score represent ng an estimate of a subject s fly ng aptitude derived from a battery of paper and pencil and p ychomotor tests Scores are g ven on a nine point normalized scale High ptitude was indic ted by a high sco e on the scale

2 Officer quality st nine A score r present ng an e timate of a subject s fficer like qu lities derived from the same battery f t ts as the pilot stan e Somet mes int rpreted a measure of ntelligen e Scor s a e giv on a nine point norm lized scale High aptit de re eived a high score

C Descr ptive

1 Ag A measure whi h w s dichotomized o that a c re of *0* was g ven subject who were ?1 year ld or le s at the time of ent y into p imary train g A score of *1* w s given to all lder subjects

2 Pr vi us flying experien e A m asure wh ch was dichotom zed so that a sco e of *0* was g ven to ubj t who had eith r no expe ence pas nge tin e o ly prio to ente ng t ain g Fo m expe ce a s ore of *1* wa given

D Ad ptab lity

1 N mb r of d merits A core o normal z d n e po nt scal The score is ba ed on the tot l number of d me its acer d dur ng the ent re tra n g per od A high n mber of demerits r ceived high score on the sc le

R ti g by E p t (Ad pt b lity O ly)

1 Milita y aptitude rat g (MAR) The mil ta y aptitude atings (MAR) are evaluations of a m n s milita y ptitude Fv luation m de on a 25 tem checklist each tem hav ng 5 poi ts R tings ar ummed ove raters for each ubject a d converted to a norm lized nine po nt scale High apt tude rating recei ed high sco es on the scale Only MAR s from nstructo s in th t ctic l dep rtment were cons d red to be at ngs by experts since o ly th tactical d partm nt was t i ed to give such r t ngs a d w in a pos t o to obs rve app p at beh io

2 Psycholog t r tings The e r ti g were m de on a three po nt al (poor = 0 qu t on ble = 1 and good = 2) from i f rmati n obt ned during an int rview suppleme ted with indi idually dm st r d clin c l tests Because of the larg number of p te t ngs nly th nam of the tr t re li ted with out d ipt of th meani g

Ge ral bil ty

Fly ng pt tud

Balance (Is performance commensurate with ability?)
Motivation relative to age and status
Motivation relative to Air Force career
Motivation relative to pilot training program
Strength of drive
Sustaining of drive
Maturity
Stability and balance
Conflicts (internal)
Stress reactions and tolerance
Frustration reactions and tolerance
Hostility feelings and management
Rivalry reactions
Distraction reactions
Educability
Super ego (guilt self esteem et cetera)
Ego-social centrism
Mental health prospects
Concern with health
Psychosexual
Interpersonal relations
Over all rating

3 Adjustment group (AG) An over all rating by a clinician using all information available on a subject including the previously listed psychologists ratings number of demerits flying and academic grades et cetera Subjects are rated on a five point scale ranging from *1* (very well adjusted to training and with a good prognosis for the future) to *5* (very poorly adjusted to training and a poor prognosis for the future)

4 Adjustment rating (AR) This rating is derived from the global evaluations of motivation and personality made in conjunction with the psychologists ratings described previously Scores are assigned on a nine-point scale ranging from *1* (inadequate motivation and personality) to 9 (excellent motivation and personality)

5 Actuarial adjustment rating (AAR) The AAR is based entirely on the psychologists ratings of specific characteristics listed earlier To obtain this score the scores on several of the specific motivation and personality ratings were summed and these sums were T scaled The data for each psychologist were handled separately in order to eliminate rater differences Good adjustment was indicated by a high score or the scale

Rating by Peer Group

A Aptitude

1 Flying aptitude rating (by psychologists) A rating on a three point scale (poor = 0 questionable = 1 and good = 2) of each subject s flying aptitude by a psychologist High aptitude was indicated by a high score on the scale

B Ad ptabil ty

1 Instruct r rat ngs (IR) Instructors of each dep tment were asked to rate each man fo adaptability on an over all basis s eith r 1 o tstand ng 2 sat fact ry 3 questionable o 4 unsat f cto y Ratings by in tructors on adaptab lity per se were n t reg ded as ratings by expe t becau e the instructors were not trained n mak ng such ratings IR s were obtain d from thre sources

Tactic l department
b Weathe dep tn ent
Fly g department

2 M lit ry apt tude r tings (MAR) These rat s d crib d ear l er are ev luat o s of a m n s military aptitud made on a f ve po t sc le on 25 tems Rating we ummed and con verted to a norm lized nine point s le A high ratin was dicated by h gh sco e on the scale P super or rat s diff r f om exp rt ting n th t th pe r superio r ters are not train d to make such atings Ratin s e e obtai d fr m four sources

a Cl s m te
b Upperc l s
c Academic dep rtment
d Fly g dep tment

ANALYSIS OF TRAINING LEVEL CRITERIA

The internal analysis of the criteria was accomplished in two parts It would have been possible to factor the intercorrelation matrix of the 41 linearly independent measures indicated in table 1 but examination of the matrix revealed that the intercorre lations of the 94 psychologists ratings were extremely high on the whole suggestin a strong halo effect Since it was obvious that the content of these ratings could be represented by fewer than the total number of measures these ratings were analyzed separately Factorin was accomplished by Thur stone s complete centroid method with the highest correlation in each column used for the communality estimate Six factors were found The criteria for cessation of factoring su gested by Guilford and Lacey Mosier and Burt and Banks were used Factors were rotated blindly with orthogonal simple struc ture as the goal Rotations were accomplished by graphically plottin the factors two at a time

No details of interpretation will be presented for this analysis *inasr uch as the primary* purpose was the identification of a small number of variables for further analysis One variable was chosen to represent each of the six factors in the final analysis The use of factor scores was contemplated but the possibility was rejected because it was difficult to find even one measure for each factor which was reasonably pure fac

torially A brief description of the variables used to estimate the factors is given on page 822 The intercorrelation matrix and the rotated factor loadings are given in tables 3 and 4

TABLE 3 *Intercorrelation matrix of psychological variables*

	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	58	54	2	12	04	04	05	33	4	0	24	4	16	26	35	5	1	06	70	30	04	13	54
2		45	04	16	12	12	22	16	0	04	20	4	18	10	8	30	11	12	0	26	15	15	42
3			06	00	06	03	0	28	18	15	3	35		81	34	46	24	05	04		34	2	43
4				61	52	53	46	4	36	3	39	1	26	38	3	8		20	70	37	76	20	5
5					79	45	42	26	36	34	39	39	40	32	32	40		4	42	26	36	3	6
6						43	43	26	36	4	3	42	24	38	36	3	4	32	3	36	3	30	46
7							6	34	54	43	51	42	4	68	2	5	41	53	44	00	43	42	62
8								2	6	4	42	6	36		54	36	3	33	34	38	34	35	59
9									32	4	31	35	38	39	26		32	36	4	24	3	36	55
10										59	4	6	5	4	38	3	37	3	6	34	44	46	6
11											6	60	52	34	50	35	56	46	5	6	6	4	70
12													54	46	56	3	40	42			55	45	7
13													56	46	52	37	46	42	64	55	6	46	
14														48	13	44	34	41	58	2	38	5	5
15															32	42	44	3	55	10	1	24	58
16																4	46	2	4	00	0	31	54
17																	3	3	46	3	36	4	64
18																		4	46	2	4	42	54
19																			52	3	34	46	5
20																				35	52	54	75
21																					46	5	6
22																						5	
23																						6	

TABLE 4 *Factor analysis of psychologist ratings rotated factor loading*

Variable	I	II	III	IV	V	VI	h^2
1 Ability general	06	90	08	02	14	15	86
2 Flying aptitude	09	60	14	15	07	01	42
3 Ability balance	08	64	04	30	21	31	65
4 Mental alertness and intelligence	23	02	69	06	02	09	54
5 Mental alertness AF career	41	07	72	07	06	21	74
6 Motivation for pilot training	40	14	71	10	06	08	70
7 Strength of will	54	00	35	47	19	05	67
8 Social assertiveness	48	05	41	10	07	32	52
9 Personality dynamic maturity	30	29	30	14	30	08	38
10 Stability balance	77	15	08	01	08	01	63
11 Confidence	71	02	20	03	35	11	68
12 Social assertiveness general	88	20	05	07	03	01	82
13 Fussiness assertiveness	85	23	03	21	07	04	83
14 Habitual reliability feelings and maturity	57	10	09	15	32	26	54
15 Reliability	50	14	27	45	06	24	61
16 Detached assertiveness	51	24	28	14	05	43	60
17 Edgy irritability	8	54	39	19	30	03	65
18 Spurning (guilt self-esteem)	46	04	35	05	30	07	43
19 Ego-centricity	42	02	27	05	37	19	43
20 Mental health with proper poise	77	12	11	10	24	28	77
21 Confidence with health	35	18	25	69	28	13	79
22 Psychological quality	56	08	23	07	31	17	50
23 Interpersonal skills	45	13	19	10	52	07	54
24 Overall rating	72	48	45	00	06	03	96

Factor I was identified as that factor

TABLE 5 *Intercor lat ons f the a mg lev l criteri*

Var bl	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
1 Ag	10	-03	14	20	05	06	00	39	37	16	-09	15	17	25	09	04	10	08	05	15	18	-08
2. P l ta		65	40	47	-04	27	10	33	22	23	28	15	12	16	30	28	53	16	18	22	16	15
3. Off er q l y tan			21	55	-08	14	11	-05	25	33	18	11	04	16	35	22	61	04	10	19	15	12
4. Fly ng gr d				31	00	16	37	44	19	24	57	24	10	27	10	42	12	07	11	04	04	17
5 A d mi erag					08	15	09	14	29	57	30	28	16	30	52	30	48	18	18	25	08	15
6. D m						01	00	06	34	01	08	22	27	31	09	09	04	12	06	0[illegible]	03	00
7 F il g fly ng grad							35	22	12	04	14	18	22	22	08	22	08	20	21	23	05	20
8. If ur fl wn l								30	01	-05	33	06	00	06	02	11	16	25	00	11	08	03
9 P fly ng per en									24	05	16	12	03	13	04	13	06	16	14	11	23	07
10 IR al d p										43	31	43	58	74	48	21	13	40	08	00	00	29
11 IR w h d p											26	24	13	36	48	09	36	15	02	-06	18	04
12 IR fly g d pt												12	06	27	20	49	28	35	01	29	14	07
13. MAR l ma													*62*	*57*	*22*	*26*	*05*	*12*	*17*	*06*	*08*	*16*
14 MAR ppe l														61	13	15	04	18	21	24	07	18
15 MAR l d p															30	22	09	16	20	12	16	11
16. MAR d mi d pt.																23	29	08	10	09	13	06
17 MAR flyi g d pt																	21	08	14	20	21	11
18 P y h g—g l bil ty																		12	24	35	30	13
19 P ych at g—mot AF aree																			39	32	26	37
20 P y h g— and c f an																				56	42	45
21 P y h ing—d tr ct																					00	31
22 P y h. g— wi h h l h																						50
23 P y h g—in erp l l																						

D im l po h bee mitt d.

The intercorrelation matrix, consisting of the psychologists ratings chosen from the previous analysis and the remaining linearly independent measures, is presented in table 5 This matrix was factored by a National Cash Register 102 A electronic computer The computer program employed Thurstone's[14] complete centroid method of factoring with the highest correlation in each column used for the communality estimate The criterion for cessation of factoring was one developed specifically for the computer Factoring was terminated when the average of the obtained communalities for all variables exceeded the average of the original communality estimates The development of the computer program and this criterion for cessation of factoring has been described in a technical report [17]

Seven factors were extracted in this analysis The unrotated factor loadings are presented in table 6 The factors were rotated blindly, two at a time by the graphic method A relatively clear structure became apparent after only a few plots, and little difficulty was encountered in approximating orthogonal simple structure The rotated factor loadings are presented in table 7

TABLE 6 *A ly f a g l l m re unro d fac or load g*

Var bl	U ro d f l ading							
	I	II	III	IV	V	VI	VII	h
1 Ag	22	19	20	16	39	18	13	35
2 P l stan	60	35	21	04	29	3	19	70
3 Off qual y stan	47	-44	33	35	08	23	09	71
4 Flying g d	53	29	29	39	19	10	20	69
5 A d m g	65	36	06	4	06	09	14	64
6 D	19	2	20	11	08	-08	08	16
7 F l g fly g gr d	35	07	06	27	08	24	17	30
8 H ur fl w l	21	10	22	42	15	10	25	3
9 P ous fly g xpe	38	10	12	28	52	10	11	54
10 IR l d p	67	3	38	34	12	30	20	91
11 IR weath d pt	43	32	14	38	21	21	18	5
12 IR flyi g d pt	49	36	19	38	4	09	15	64
13 MAR l ar	51	4	30	19	0	22	1	51
14 MAR upp rcl	46	48	23	29	14	31	07	0
15 MAR l d pt	64	28	38	6	08	08	03	71
16 MAR ad m d	49	3	06	7	12	15	15	43
17 MAR fly g d pt	47	18	09	24	10	16	13	37
18 P y h ar g—ge l ab l ty	48	-44	44	17	13	09	16	0
19 P y h g—mo at AF	46	23	16	4	15	3		57
20 P y h ra g— tr t and ler	45	36	48	1	10	07	14	63
21 P y h g—di	37	10	-43	18	38	5	21	6
2 P y h. g—c b h l h	30	4	41	06	30	13	36	56
23 P y h ating—int rperso al lat on	40	31	-41	18	12	10	15	50

D imal poin h bee omi d

Factor Interpretation

The interpretation of the factors is based largely upon the data in table 8 This table lists the factor loadings of the vari ables defining each factor The relatively well isolated clusters obtained after rotation left little question as to choice of de fining variables and contributed toward an answer to question

personality not measured by the other data and this aspect may be an important determinant of success At least until the validity of the factor was tested the term *personal adjustment factor* was applied

Factor IV Factor IV was primarily defined by two objective flying performance measures and two ratings by the flying department instructors These ratings by the instructors as those of the tactical department seem to have been strongly influenced by performance in the specialty of the instructors Because all of these measures came from the flying department the title of *flying performance factor* was assigned to this factor

Factor V This factor was the most difficult to interpret The only logical relationship in the cluster is between age and previous flying experience It is to be expected that the older men would have more opportunity to obtain flying experience prior to entry into the service For lack of a better interpretation this factor was called the *age factor*

Factor VI The defining variables of tactical department instructors rating and the psychologist rating of motivation relative to an Air Force career are logically related inasmuch as it was expected that the desire for a military career would be reflected in ratings by tactical department instructors An alternative explanation of the factor would be to assume that individuals who tend to conform to the needs of the military and accept the authority relationships inherent in the training situation would be perceived more favorably by the tactical officers and psychologists If this were so then the factor might be related to conformity Hence the most descriptive name seemed to be *military conformity factor*

Factor VII The defining variables for factor VII are all related to academic success and as might be expected load appreciably on the ability factor Nevertheless some source of variance independent of ability also is reflected in these measures It seems that a motivation peculiar to academics manifested by interest attention and studiousness could best account for the covariation On the basis of this reasoning the factor was called the *educability factor*

Assuming that the preceding interpretations are correct there are four factors (military aptitude personal adjustment military conformity and educability) related primarily to adaptability two factors (ability and flying performance) related to aptitude and technical proficiency and one factor (age) with no apparent psychologic meaning

Validity of Training Level Criteria

The second phase of the investigation was concerned with the relevance of the training level factors to posttraining measures As an estimate of each of the seven training level factors the defining variables marked with an asterisk in table 8 were converted to standard scores and summed with unit weights as suggested by Trites and Sells [18]

Table 9 contains the results of the correlational analysis of the factor scores with the follow up criterion Included with the seven factor scores are the three global indexes of adaptability the adjustment rating, the actuarial adjustment rating and the adjustment group Because these have seen much use in test development, estimates of their relevance were desired In this table and all succeeding tables a positive correlation indicates a relationship which is in the expected direction * Inasmuch as the direction of each relationship was predicted on a priori grounds, the probabilities reported are for one tailed tests of significance The data in this portion of the analysis provide information relative to question 2 Which of the characteristics reflected in the early measures are predictive of success in later career stages?"

TABLE 9 *Validities of the training level criteria based on correlations with Form 66 scores*

Training level measure	Correlation with Form 66 score	Number of cases
Military aptitude factor	06	358
Ability factor	14	308
Personal adjustment factor	09	376
Flying performance factor	16	193
Age factor	02	365
Military conformity factor	08	379
Educability factor	12	273
Adjustment group rating	14	423
Actuarial adjustment rating	11	380
Adjustment rating	13	381

All probabilities reported for one tailed tests
Significant at the 05 level
Significant at the 01 level

It is obvious from the table that all of the relationships were in the expected direction and that the ability factor, the personal adjustment factor the flying performance factor, the educability factor and all three of the global psychologists' ratings were

[18] Much as there was no reason to predict age trends in the direction effected ensuring that age factor weights arbitrarily called so that older men might have more

related at low but statistically significant levels ($P < .05$) to the posttraining criterion

The extremely small relationship between the age factor and the follow up measure partly supports the interpretation of the factor as little relationship between age and effectiveness would be expected The insignificant relationships found with the military aptitude factor and the military conformity factor were surprising It would seem that motivation for a military career and military conduct should be more predictive of success in a military organization The lack of relationship found for the military conformity factor can possibly be explained in terms of the unreliability of the factor score as only one measure was deemed of sufficient factorial purity to be used in factor score estimation This was not true of the military aptitude factor which was estimated by three measures each of which is a composite of scores from a number of raters It seems likely in retrospect that the military aptitude ratings reflect an adjustment or adaptation to military living Because the ratings were made relatively late in the training program most of the men who could not adapt successfully had been eliminated before the ratings were obtained Consequently the group being rated was either initially or became very homogeneous with respect to adaptation to military training conditions This being the case several explanations may be offered for the lack of relationship with the posttraining criterion

First the raters may have judged the men on the basis of their entire performance during the training period Such judgments would not take into account the increasing homogeneity of the group thus the ratings would reflect original differences and not the final homogeneous clustering of the subjects

Second it may be that the raters assessed the subjects on the basis of their adaptation to training at the time of rating If the group were homogeneous the small differences reflected in the ratings would be expected to have little relationship to the posttraining criterion This also implies that the reliability of the military aptitude ratings would be low The intercorrelations of the ratings given in table 5 may be used as rough estimates of their reliability It can be seen that all of these are below the generally accepted level of variable reliability for simultaneous rating data This lends some support to this explanation of the negligible relationship with the posttraining criterion

---

O ly 51 f h 998 ubj wh Il f l d h tr g p g m f h m
p od l d h h ll tr ng h m h m l ary p d
g w b i

Finally, it may be that the behaviors assessed in the military aptitude ratings simply have no relationship to posttraining performance and adjustment

The adjustment rating, the actuarial adjustment rating, and all of the measures which entered into the computation of the factor score for the personal adjustment factor are based on *post hoc* evaluations of the candidates' adjustment to the flying training program, made by members of the research staff after the candidates left the program The evaluations were based largely on the results of a number of psychologic tests and information obtained during extensive personal interviews with the students Since all of these measures are significantly related to the posttraining criterion, it appears that the psychologists were capable of differentiating degrees of adjustment even in a highly select and homogeneous group of normal youths The adjustment group score, a composite rating made by staff members, based on all the information available on a given subject (see page 825) would naturally be expected to be related to the posttraining criterion inasmuch as the majority of the variables from which it was derived were significantly related

While the magnitudes of the relationships found between the training level and posttraining measures demonstrate that they are far from being equivalent there is evidence that the earlier measures approximate the later criterion Though these results do not justify the exclusive utilization of the training level measures they do provide additional evidence that continuity exists between the training and posttraining situations [1]

Comparison of Adaptability and Aptitude Measures

To answer question 4 ("What differences in the relative importance of various personal characteristics are found at different stages in the career sequence?") table 10 summarizes the results of one of the comparisons of aptitude and adaptability measures These two variables called the total adaptability factor score and the total aptitude factor score are compounded from the factor scores The total adaptability factor score is a summation of standard scores from the military aptitude factor personal adjustment factor, military conformity factor and educability factor The total aptitude factor score is a summation of standard scores from the ability factor and the flying performance factor This simple addition of standard scores does not give the optimum combination for prediction of the post training criterion but multiple regression, although giving maximum prediction, tends to capitalize on chance deviations Hence, this method should give a more conservative estimate of the comparative validities of the two types of measures

For those aspects of eventual success in a flying career as measured by the Form 66 score the aptitude performance measure is a slightly better predictor than the adaptability measure The difference between the two correlations however is not statistically significant These results support the hypothesis concerning the equivalence of training level measures of flying proficiency and adaptability for prediction of a posttraining criterion

TABLE 10 *V l d t f comb d f t cor b d rr l t u th F rm 66 cor*

S or	C r l t n w th F rm 66 or	N mb r f
T t l pt tud f t or	19	147
T tal d pt b l ty f ct	15	262

All p b b l port d for e- led t
S g f h 05 l l

The results of the comparison of adaptability and aptitude screening tests are presented in table 11 The correlation of pilot stanine with pass fail status in training is significantly greater than the correlations between any of the adaptability tests and pass fail status although two of the adaptability measures are significantly related to the pass fail criterion

TABLE 11 *Corr lat ons f adaptab l ty me sur s with an apt tude*

Vari bl	C l with p f l t in ng	Numb f s	C rr l t wi h F m 66	N mb r f
P l t nin	53	1341	13	396
P l l t ty	11	679	10	267
Cor ll ind	10	1033	11	335
Cor ll w rd f m	00	639	05	307

S g f an at th 05 l l
Sig f ca t th 01 l l

On the other hand in comparison with the posttraining criterion the relationship of the aptitude measure is greatly diminished while no comparable decrement is found for the relationships with the adaptability measures The same tests which proved to be significant predictors of pass fail status also prove to be significant predictors of the posttraining standard but the obvious superiority of the aptitude measure is no longer evi dent Thus the hypothesis concerning the increase in importance

of aptitude for pilot training to pilot success in the prediction of a combined criterion is studied.

Other important information is also gained from this comparison. The aptitude for screening scores which have been developed with the aid of the Form 66 criterion proved to be significant predictors of performance as indicated by data on the Form 66 criterion ("Are test developments with the aid of the early measures also predictive of later criterion success-fully?") therefore can be answered in the affirmative. The finding supports the continued use of the criterion-free procedure in test development work. Although the low level of the relationships between the aptitude and the performance criteria certainly indicates the further study and refinement of the training level data are needed.

Even though the reported validities of the aptitude battery and its tests are relatively low using correlation methods, this does not preclude their use in a valid screening battery. The three tests studied were originally validated against a battery developed with samples chosen on the basis of the pilot level criteria. In operational use these tests are not employed individually using the predetermined cutting scores but are combined by multiple regression techniques to form a composite score. It is necessary therefore, to determine whether the battery could be used to advantage economically, regardless of the magnitude of the correlation with the proficiency criterion.

To estimate the operational utility of the aptitude screening tests comparisons have been made with the Form 66 scores as the criterion. The subjects have been divided into criterion groups—as nearly as possible, into the lower 25 per cent, the middle 50 per cent, and the upper 25 per cent based on the entire distribution of scores on the Form 66 measure. In addition to studying each test singly in relation to the Form 66 score, it was deemed desirable to study the effect of aptitude on the efficiency of screening. To facilitate this study comparisons were made between the test scores and criterion standing, after eliminating subjects with pilot stanine scores of 3 and below, 4 and below, and 5 and below, successively. These pilot stanine values were selected to correspond to recent requirements for entry into pilot training.

Data for these comparisons are presented in tables 12 and 13. The chi square values reported at the sides of each distribution are the values that are obtained if the cut is made at the point indicated; that is, if all subjects above the cut (low score) are predicted as being well adjusted and all those below the cut (high score) are predicted as being poorly adjusted. No table giving similar data on the Cornell word form is included as the

The chi square values obtained indicate that screening on the basis of an aptitude measure has little if any effect on the validity of these adaptability screening devices

TABLE 12. *Validity of the Cornell index at increasing levels of flying aptitude*

Pilot anin

≥4					≥5					≥6				
	Form 66					Form 66					Form 66			
CI	L	M	H	χ^2	CI	L	M	H	χ^2	CI	L	M	H	χ^2
0	18	37	25		0	18	32	24		0	16	26	17	
1	9	35	19		1	7	29	18		1	5	20	14	
2	6	17	10		2	6	15	10		2	6	13	10	
3	4	13	6		3	3	13	6		3	2	10	6	
4	10	9	6		4	7	9	4		4	3	7	3	
5	2	7	4	6 34	5	2	6	4	7 60	5	2	5	4	6.11
6	4	4		2 41	6	3	2		3 96	6	1	2		5 02
7	1	4	1	2 88	7	1	4	1	4 71	7	1	2	1	5 88
8	3	1	1	1 30	8	3	1	1	2 72	8	3	1		1.72
9	1		1		9	1		1		9	1		1	
10	1	3	1		10	1	3			10	1	2		
11	1	1			11	1	1			11		1		
12	1				12	1	1			12	1			
13		1			13					13				
14					14					14				
15		1			15					15				
19		1			19		1			19		1		
26		1			26		1			26		1		
T 1	61	135	74	270		54	118	69	241		42	91	56	189

S g f at l tha th 05 l vel

Examination of the data for the Cornell index indicates that the cutting score (9 and above) recommended on the basis of previous research is not the most efficient using the Form 66 measure as the criterion This may be due in part to restriction in range as the percentage of cases above the cut in this select sample is very small These data do indicate however that any cutting score from 6 through 9 might be satisfactory

A significant relationship between the personal inventory and Form 66 criterion standing could not be demonstrated by chi square in spite of the fact that the product moment correlation was significant This may be due to restriction in the range of score Examination of the data reveals that no other cutting score could be feasible with this test because too large a proportion would have to be screened

TABLE 13 *Validity of the personal inventory at increasing levels of flying aptitude*

	Pilot stanine											
	≥4				≥5				≥6			
	Form 66				Form 66				Form 66			
PI	Lo 25%	M 50%	Hi 25%		PI	Lo 25%	M 50%	Hi 25%		PI	Lo 25%	M 50%	Hi 25%	
0	1	9	0		0		8	8		0		7	6	
1	28	50	39		1	27	51	36		1	19	36	29	
2	9	31	11	$\chi^2=92$	2	9	30	11	$\chi^2=1\ 57$	2	8	21	9	$\chi^2=95$
3	1	1	3		3	4	3	3		3	4	2	3	
4	1	1			4	1	4			4		4		
5					5					5				
6			1		6					6				
7					7					7				
8					8					8				
9		1			9		1			9		1		
Total	13	108	63	214		41	97	58	196		31	74	47	152

strated by the significant relationships found between the experi mental adaptability screening tests and the posttraining criterion

ACKNOWLEDGMENT A p j t f th m g t d qui d he t f many pe pl Sp c f lly th w t w h t kn wl dg th d ce n ur g m t and tan th gh t th ur f th t dy f D S l B S ll d D d K T D p tm t f M d al P y h l gy S hool f A at on M d USAF and f D W y H H lt m of th U ty f T B B C bb D p rtm t f M d l P y h l gy t b ed g tly to th t t t l ly s f th d and h t c l w f th f l man p by Dr B y O H rtman D p tm of M d l P y h l gy s gr t f lly k wl dg d Th pr l m ty w k th g y t m d bl 2 w mpl h d by D W ll m F B w

REFERENCES

1 S ll S. B *R ar h Pr gram on th P y h atri S l t f Flyi g Per onn l M thod l g al Int odu t on and Experimental D sign.* S h l f A M d USAF P j t N 21 37 002 R p rt N 1 N 1951

2 S ll S. B d B rry J R R h pr gr m t d l p p y h l f fly g p I h t l pp h d h d ig *J Aviat M d.* 24 29-35 F b 1953

3 Sell S B d B rry J R R h p g m d l p p y h tr l ct f fly p l ar h p g *J Aviat M d.* 24 36-47 F b 1953

4 Th d k R L *Per onn l S l ct on T t and M asurement T hn qu* J h W l y & So N w Y k N Y 1949

5 S D G P d b l ty f ar us k d f *Per onn l P y h l* 5 93-104 1952

6 Guilf d J P d L y J L (d) *Pr d Classif at T t* A P y h l gy P gram R ar h R pot N 5 Army Ai F U S W D partm t U S. G m t P u g Off W h gt D C 1947

7 Guilf d P Som l f m p y h l gy *Am. Psy h l* 3 3-11 J 1948

8 J kin j G l *Th Combat Criteri Naval Aviat on* N R C. C m- m A P y h l gy R p N 6 U S G m P g Offi W h g D C 1950

9 J k J G V l d ty f wb *J Consult Psy h l* 10 93-98 Mar Ap 1946.

10 T D K d K b l A L Char f f l p l *J Aviat M d.* 28 34 40 F b 1957

11 B rry J R d R yno G H *Psy h atri Screen g f Fly g I er onn l R ar h on th Com ll Ind x.* S h l f A t M d USAF P j N 21 0202-0007 R po N 2 M y 1953

12 Barry J R S ll S B d T D K *Psy hiatri Scr en ng f Fly g Per onn l R arch on th C rn ll Word Form* S h l f A t M d USAF Pr j N 21-0202-0007 R p N 7 M y 1954

13 T D K *Psychiatri Scr ning f Flyi g Per onn l R ar h on th Per onal l ventory T t.* S hool f A M d USAF P j N 21 0202-0007 R p rt N 8 N 1954

14 Thur L L *M lt pl Fact Analy* U y f Ch g P Ch g Ill 1947

15 M t C. L I fl f h g rr mpl ur mpur l g f ff f h rr d m d mmun l mpl ur f l an ly *P ychom rika* 4 33-44 Mar 1939

16 Burt C d B k C A f t ly f b dy m ur m f B h d l m l *A n. E gen* 13 238 256 J 1947

17 P B P d G R B *Appl ab l ty f H gh Sp d Computat on t Fact A alysi Per onn l A signment and M l pl Discrimi ant Fun t on.* R ar h p rt So hw R ar h In San An T 1954

18 T D K d S ll S B N lt at m hod f ing f *J Appl Psy h l* 39 455 456 D 1955

19 T D K d S ll S B C mb p rf m m ur m and p d on *J Appl P ychol* 41 121 130 Ap 1957

LOCAL INJECTION OF VITAMIN A (KERAMIN) FOR PLANTAR VERRUCA

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MALVIN J WILLIAMS *Lieutenant MC USNR*

THE purpose of this article is to report the successful use of an aqueous vitamin A preparation commercially available as Keramin injection, in the treatment of plantar verruca This represents the results of a study carried out on 100 patients at this training center over a period of 18 months

Vitamin A given systemically has been claimed to be clinically effective in the treatment of various dermatological disorders associated with hyperkeratosis These include warts corns, calluses exzemas, and excessively dry skin Oral administration of 100 000 units of vitamin A daily was followed by the disappearance of warts in an encouraging percentage of cases by Fisher and Chamberlain [1] who used this treatment in a series of 42 cases Chamberlain[2] also reported that in 60 to 80 per cent of all cases warts disappeared after 6 to 12 weeks on this regimen While treating a large number of patients with follicular hyperkeratoses and other dermatological disorders, Straumfjord[3] observed that corns and calluses in many patients receiving a daily intake of 100 000 units of vitamin A for a long period seemed to clear spontaneously May is of the opinion that vitamin A should be given first choice amongst the conservative types of therapy for plantar warts" We have used oral vitamin A in treating numerous patients in the past few years with a very minor degree of success The cases that responded were few and even then it was difficult to determine whether improvement was due to the vitamin A or to the unpredictable nature of the wart itself

Vitamin A is stored in the liver and does not normally occur in appreciable quantities in the skin Only an enormous oral dosage could then be expected to cause enough spill over from the liver to affect skin lesions It was reasoned that direct injection of the vitamin into a lesion would overcome this difficulty With this in mind Steinberg [4] investigated the use of vitamin A by local injection into warts and reported encouraging results A number of undesirable reactions occurred in this

From U S Naval Training Center San Diego California

The average number of injections was 4 2 As many as 14 injections were required in one patient with an extremely resistant mosaic verruca while five patients required only a single injection No explanation can be offered for the occasional failure seen in this study Keramin injections were discontinued if no involution was noted after three or four injections Perhaps with a little more persistence some of the failures may have responded favorably In a few instances it was noted that verruca present elsewhere on the body regressed following the local injection of Keramin for plantar verruca

Reactions encountered were few and restricted only to itching around the site of injection Two patients experienced itching of a mild nature for about 12 hours following the injection A few additional patients complained of mild itching which subsided within two to three hours No infection or severe pain occurred in any case Keramin injection is contraindicated only where injection therapy in general is contraindicated as for instance in peripheral neuropathies diabetes peripheral vascular diseases radiodermatitis or general debility

DISCUSSION

Although plantar warts are among the common lesions occurring on the sole of the foot they are often passed over lightly and frequently mismanaged The diagnosis need not be difficult if it is remembered that paring down of the lesion will readily reveal the signs by which plantar verruca may be distinguished from callus or corn The most resistant form of verruca is the mosaic type This consists in hyperkeratotic irregularly outlined patches sometimes as large as a silver dollar topped with a rather granular friable thick horny layer It resembles (and is often treated as) a common callus When this lesion is pared down the multiple cores are revealed and the patch is seen to be formed from the fusion of several contiguous warts so as to give a mosaic appearance Mosaic warts resist x ray therapy and their extensive surfaces usually preclude surgical electrosurgical cryotherapy and many forms of chemotherapy They are the least common type seen and are often painless the patient seeking medical attention for cosmetic reasons The mosaic warts were usually injected from two or three different angles and as much as 0 4 to 0 5 ml of Keramin was needed in some cases Keramin injection has proved extremely useful in treating this very resistant form of verruca The multiple or the mother daughter type of verruca plantaris follows the mosaic type in its resistance to treatment Here the mother lesion was injected and occasionally one or two of the larger satellites The results also were very gratifying with this type In the case of the single or isolated plantar verruca other technics such as curettage also are effective in many cases and may be used alternatively as the skill and preference of the operator dictate

When dealing with service personnel, ambulation is of the utmost importance Keramin injection permits the patient to return immediately to the job with no bulky bandages or change in bathing habits This in itself is an advantage over many previous methods of treatment

SUMMARY

The local injection of Keramin (vitamin A) into plantar warts resulted in complete resolution in 82 per cent and relief of pain in 95 per cent of a series of 100 cases No recurrence was observed within a six month period of observation Keramin injection appeared to be equally effective in all three types of plantar verrucae It is especially valuable in the multiple and mosaic varieties where other methods are inadequate as evidenced by the high incidence of failures and recurrences Extensive surgery with skin grafting, radiation and the stronger caustics may now be avoided even in these intractable lesions The only side reaction was itching, which occurred in a small per centage of patients

REFERENCES

1 F h S H d Ch mb rl W E R ntg and vit m A th rapy f r tr tm t f w rt mp of 2 m thod and report f 315 tr t d ca *Pennsylvania M J* 51 151 155 N 1947

2 Chamberl W E W ts (Q a d M nor N t S) *J A M A* 140 1192 A g 6 1949

3 St umfj d J V L o of vit m A d f y th l l har t nd chr c ty *N rthwe t M d* 41 229-233 July 1942

4 M y H Surg l t tm t f tra bl pl tar wart *S Cl n North America* 31 607-616 Ap 1951

5 St b g M D N w t tm t f t t wart p rt f 300 *Surg y* 39 642 644 Apr 1956

6 S b g M D N w m h d f h tr m f r ant verru *J Nat As oc Ch ropod ts* 44 17 25 July 1954

THE PRONOUNCEMENT OF DEATH

One should not hurry in pronouncing death if relatives ar present To offer a specific example sometime ago a phy i- cian was called to care for the son of a fellow practitio- The child was obviously dead but the attending doc- alized that the father had not consciously acc- fact Thus for a short period the doctor busie- with the child while at the same time wi- a- marks prepared the parent for the prono- Some may criticize this approach Oth- it as one of the highest forms of the pra- medicine—an art which takes into consi- al response of those to whom the phy- Edward R Bloomquist If a Man Must D- *cian* February 1

PARENT ATTITUDES AND CHILD GUIDANCE PRACTICES

JAMES H BRYAN *F t L t t MSC USAR*
PERRY LONDON *F t L t t MSC USA*
CARL LAUTERBACH *C pt t MSC USA*

THE crucial role of parents in the formation continuation, and resolution of children s emotional disorders is all but universally recognized by workers in child guidance This knowledge has dictated some common administrative poli cies regarding treatment in many clinics Some agencies refuse psychotherapeutic treatment to children whose parents will not simultaneously undergo therapy others though not insistent that the parent receive therapy demand intermittent interviews with parents either for counseling purposes or for collating in formation about the child and family [1]

Generally the mother is specified by the clinic as the sig nificant other to be worked with while the father is typically relegated to a minor role While this position is in part, an inevitable consequence of the practically greater accessibility of mothers in terms of free hours it also is dictated by pre sumably sound theoretical notions

On rational grounds, it may be argued that mothers as a group are more intimately involved than fathers with their child s devel opment, actions and thoughts Their vested interests in their children are presumably greater than the fathers and they are consequently deemed both more responsible for and more knowl edgeable about their children s behavior

However plausible these assumptions their validity may be questioned on several grounds First many workers have had the experience of finding that fathers are sometimes considerably more "workable than mothers both in terms of the reliability of the information they communicate about life in the family and the use they are able to make of collateral counseling An ex treme but not uncommon example of this phenomenon is noted in working with parents of schizophrenic children The question arises too as to whether clinics are not in practice usually so implicitly oriented toward the mother and her role in the child s maladjustment that little empirical exploration of the

F m Mad g Arm H p l T m W h R p n h ld b q d f m Cap L b h N ur y h D p m W l R d Army H pit l W h g D C

father's role is attempted, especially in those cases where financial and marital conflicts in the home are not obviously noted

Most important, however, is the fact that, in any actual contact with parents, the clinic is confronted by distinct personalities whose behaviors are only partially dependent upon their parental role as mothers or as fathers In this context, the issue of what kind of persons they are and what attitudes they hold may be more important than whether they are mothers or fathers The answer to this problem may determine the effectiveness of any help which the clinic can offer the child and the family through the parents This issue must be resolved by a study of the individual parents Is this person truthful, naive, deceitful? Does he or she manifest a defensive, open, or critical attitude—toward self, spouse, child, or clinic? Is the parent eager and motivated for help, or skeptical or indifferent regarding his own involvement in the child's difficulties?

In an attempt to approach the above questions empirically, the performance of 64 mothers and 46 fathers on the so called validity scales (L F, and K scales) of the Minnesota Multiphasic Personality Inventory were analyzed These scales which are part of a self attitude questionnaire, include respectively measures of (1) truthfulness (2) a self critical attitude, indicative of rational and pertinent self evaluations, and (3) defensiveness Parents were selected consecutively as their children were referred to a military child guidance clinic over a six month period

It was found that the performance of the two groups, in terms of the test s standards for normal performance, were generally the same as would be found in the population at large [6] It also was found that in general, there were only small differences between the performance of mothers and fathers

One exception to the above, however, was discovered It was noted that mothers tend to be somewhat less truthful or more naive than fathers, as measured by the lie scale, although the overlap of scores of these groups even on this scale was considerable The mean score of the mothers on this scale was significantly greater than that of the fathers ($t = 3.10$ $P < .01$) Mothers and fathers, as a group, were not distinguishable in their mean scores on scales which measure self critical attitudes, and subtle ego-defensive tendencies (F and K scales respectively) but mothers were more variable on all scales particularly on the K scale of ego defensiveness ($F = 2.06$ $P < .05$)

IMPLICATIONS FOR CLINIC OPERATION

The ramifications of these findings are apparent at three levels of clinic operation the intake process, the collateral treatment process and the disposition process

Intake At the intake level a case history is routinely obtained this history then becomes a primary datum for the clinic exerting some influence on every further aspect of the clinic s decisions in relation to the subject family Its reliability and validity is therefore of great importance In most situations it is commonly assumed *a priori* that more complete historical data is available from the mother than from the father While this may well be so with respect to many important aspects of the child s development it may be far from the truth with respect to equally critical aspects of the ongoing relationships between child and parents In terms of the highly personal communications which must often be obtained from parents our data suggest that the average father is more truthful[8] and no more personally defensive in his self evaluations than his spouse A practical measure suggested by these data is therefore that in obtaining information about critical personal interactions of child with parents it is well to make no assumptions about the adequacy of information available from either parent and to interview both, as is suggested in a recent article However valid the culturally defined role of mother as the most significant figure her status as the more adequate informant is questionable

Treatment At the collateral treatment level the limited facilities both in terms of time and personnel often make the agency s selection of a single parent to be worked with one of crucial importance In such instances it is often wise to work not with the parent who *needs* the service the most in the sense of being the most critically troubled or malfunctioning but with the parent who can *use* service the most in benefiting all the affected members of the family Here too the usual assumption is that this parent is the mother not the father[7] and again our results contest the validity of this notion The equal rationality pertinence and frankness of fathers and mothers in their self evaluations may indicate that the former are as susceptible as their wives to rapid assimilation of the benefits of treatment The point here too is that the case must be judged on its individual merits rather than from any doctrinaire position

Disposition Finally problems of disposition require careful consideration Not only must child guidance clinics frequently refer families to other agencies for a variety of diagnostic and therapeutic services, but they also are often in the position of having to offer suggestions which infringe on the sensibilities of the parents such as recommendations for institutionalization in mental hospitals or homes for the retarded or foster home placement In most such cases the authority of the military child guidance clinic is quite strictly limited to making the recommendation to the parents who must themselves assume the responsibility for acting on it Here more than in other functions it i the attitude not the role of the parent which will determine whether or not the recommendation will be followed When the respective attitudes of the father and mother differ

greatly, as is often the case, it is important for the clinic to direct recommendations toward the parent who is most open and receptive to them and who is best able to judge their importance and undertake the responsibility of helping the spouse to understand and accept them In this way, the less defensive and better motivated parent may be a real aid to the worker in facilitating adequate disposition Our data suggest, here too, that the problem of assessing which parent is most amenable is an individual matter that must be separately ascertained in each case

SUMMARY

The aim of this study was to establish empirically whether the mothers and fathers of children referred to a military child guidance clinic differ significantly in attitudes which indicate relative susceptibility to counseling and psychotherapy The "validity" scales (L, F, and K) of the Minnesota Multiphasic Personality Inventory, which attempts to measure truthfulness, self critical attitudes, and defensiveness, respectively, were employed as criterion measures These were administered to 110 consecutively selected parents including 64 mothers and 46 fathers, referred to the child guidance clinic at this hospital for a wide variety of child problems

Performances of mothers and fathers did not differ widely on the scales of self critical attitudes (F) or defensiveness (K), but mothers obtained significantly higher mean scores on the truthfulness (L) scale

Implications of these findings for intake, treatment, and disposition procedures were discussed and the common practice of relying more exclusively on mothers than fathers in these clinic operations was questioned In general it was concluded that the individual attitudes of both parents, rather than the formal maternal or paternal role should be assessed early in the case evaluation process and serve as the operational criterion for determining with which parent or both, further extensive guidance work should be conducted

REFERENCES

1 Zehr F A. Child guidance in the armed forces *U S Armed Forc M J* 9 1161 1167 Aug 1958

2 Bibring E The role of the developmental point of view in psychoanalytic theory (edited) *The Psychoanalytic Study of the Child* International Universities Press New York N Y 1954 Vol IX pp 297 333

3 Mattag E K and Thompson W W Child guidance clinic Army hospital *U S Armed Forces M J* 4 1753-1766 Dec 1953

4 Powell D Walbright S and Lerro J M differential child guidance program in Air Force hospital *U S Armed Forces M J* 8 1653-1657 Nov 1957

5 Levy D M *Maternal Overprotection.* Columbia University Press New York N Y 1943 pp 3-5

6 Hathaway S R and McKinley J C. *Minnesota Multiphasic Personality Inventory Manual* The Psychological Corporation New York N Y 1951 p 12

7 Lippman H S. *Treatment of the Child in Emotional Conflict* McGraw Hill Book Company New York N Y 1956 pp 25-26

Hypofibrinogenemia Following Severe Spontaneous Abruptio Placentae

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HYPOFIBRINOGENEMIA producing a hemorrhagic state in pregnancy may accompany cases of severe abruptio placentae intrauterine retention of dead fetus and amniotic fluid embolism The manner in which the fibrinogen depletion occurs is not fully understood

Page Fulton and Glendening advocated the theory that this depletion of fibrinogen is caused by excessive liberation of thromboplastin from the placenta and decidua The thromboplastin being forced into the maternal circulation is considered to cause conversion of prothrombin to thrombin which in turn converts fibrinogen to fibrin The fibrin then is deposited in the blood vessels of the maternal circulatory system

Stouffer and Ashworth offered the theory that hypofibrinogenemia results from large amounts of fibrin being deposited in the intervillous spaces of the placenta and on the maternal surface of the detached placenta The presence of fibrin emboli found in other organs then would be explained by the detachment of patches of fibrin from the placenta

Sandmire and Covalesky stressed the importance of having on hand an available supply of fibrinogen even in isolated station hospitals The following case is presented to re emphasize how urgent the need for fibrinogen may become if one of the obstetric accidents gives rise to hypofibrinogenemia

CASE REPORT

A 33 year old Caucasian woman para 3 gravida 10 abortus 6 was admitted to the hospital at 0500 hours 28 May 1958 complaining of constant abdominal pain of two hours duration Her estimated day of confinement was 28 June The patient had been awakened at 0300 hours with constant cramping pain in the lower abdomen and a feeling of extreme weakness En route to the hospital at about 0430 hours she had noted a sudden gush of blood from the vagina

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From the Valley Forge Army Hospital Phoenixville Pa

The patient had been followed regularly in the prenatal clinic since 16 December 1957 Her total weight gain was 15 pounds her blood pressure had been in the normal range of 120/70 mm Hg and urinalyses had been negative Her blood was type O Rh positive with a hemo globin of 10 7 grams per 100 ml Past history revealed that she had had six successive spontaneous abortions following the delivery of her first child but no complications with the remaining pregnancies

On admission examination revealed a markedly pale gravid woman appearing to be in acute distress There was evidence of about 1 000 ml of bright red blood in the linen of the ambulance litter and there was moderate continuous bleeding from the vagina The patient s blood pressure was 110/70 mm Hg pulse rate 100 per minute and respi rations 30 per minute The fundus uteri was 30 cm above the symphysis pubis and rigid Fetal parts could not be outlined and fetal heart was not heard

A 500 ml unit of dextran intravenously was started at once The initial blood specimen revealed hemoglobin of 9 8 grams per 100 ml and a specimen of blood placed in a clean test tube did not form a clot Blood was noted to be oozing from the venous puncture sites Between 0600 hours and 0700 hours 1 000 ml of preserved whole blood and 1 gram of fibrinogen was given intravenously A fibrinogen deter- mination on blood specimen drawn at 0700 hours revealed no demonstra ble fibrinogen Vaginal examination at 0700 hours revealed the cervix 50 per cent effaced and 1 cm dilated The vertex was presenting at −1 station An attempt to rupture membranes was unsuccessful

Between 0700 hours and 1000 hours the patient was given 1 000 ml of fresh whole blood to replace the estimated loss per vagina since admission During this time she also was given an additional 4 grams of fibrinogen At 1100 hours uterine contractions were occurring every 3 or 4 minutes vaginal examination revealed the cervix dilated 3 cm and amniotomy was performed

Fibrogen level at 1100 hours was 112 mg per 100 ml Labor pro- gressed satisfactorily and spontaneous delivery of a stillborn infant weighing 5 pounds 9 ounces occurred at 1600 hours Demerol hydro chloride 100 mg was used for sedation and caudal anesthesia was given at 8 cm dilation of the cervix About 1 500 ml of blood and fluid was expressed with the placenta immediately following delivery of the baby The placenta appeared to have been 100 per cent prematurely separated from the uterus An additional 1 000 ml of fresh whole blood and 1 gram of fibrinogen was given during the second stage of labor and early postpartum period An intravenous infusion con- taining pitocin was started following delivery and the uterus contracted and bleeding subsided The fibrinogen level was 225 mg per 100 ml

Urine output during the first 8 hours consisted of 4 bloody urine however the rate gradually increased in 12 hours following admission On the first po patient developed a pneumonitis in the right lung

104 F temper ture but promptly responded to antibiotics An additional 500 ml of preserved whole blo d was g ven n the first po tpartum day The hemoglobin on th second postpartum day was 10 grams per 100 ml The remainder of the postpartum cour w uneventful and examination at six weeks postp tum revealed normal involution of th uterus and the patient was asymptomat c

DISCUSSION

In review of 11 cases of abruptio placentae and hypofibrinogenemia Pritchard showed that blood loss is not excessive from the site of placental implantation if sufficient myometrial tone can be maintained Also the fibrinogen concentration can be expected to return to an effective level within 8 to 12 hours after the uterus is emptied even without fibrinogen having been administered Homologous serum jaundice has been observed to occur in approximately 5 per cent of patients receivin„ fibrin ogen Since this condition may be fatal fibrinogen must not be administered indiscriminately

If there is inadequate clot formation in the clot observation test or if the plasma fibrinogen level approaches 100 mg per 100 ml or less the deficit should oe corrected prior to any oper ative procedure Three to six grams of fibrinogen will usually be required to correct this deficit The case preserted here again demonstrates the necessity of having fibrinogen readily avail able on all obstetric services because its use is mandatory in cases of abruptio placentae with severe hypofibrino„enemia or in refractory cases where delivery must be performed via the abdominal route

SUMMARY

A case of hypofibrinogenemia with profuse hemorrhage fol lowing severe abruptio placentae is presented including a brief discussion of the cause Fibrinogen should be readily avail able on all obstetrical services and given only when a significant deficiency is demonstrated

REFERENCES

1 P g E W F l L D d Gl d ni g M B C f blood gul t d f f ll w g b pt pl t *Am J Ob t & Gyn c* 61 1116-1122 May 1951

2 S uff J G d A bw rth C T Hypof br nog mi d pl *Am J Ob t & Gyne* 75 407-417 F b 1958

3 S dm H F d C l ky B M Af b nog m lt ng f m mni i fluid f *U S Armed For M J* 7 1351 1355 S pt 1956

4 P h rd J A Ab p pl ta d hyp l b g m *Am Ob t & Gyne* 76 347 362 Aug 1958

False Positive Spinal Fluid Kahn Test in Infectious Mononucleosis

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CLINICIANS are no longer surprised at the myriad of ways in which infectious monocleosis may present itself [1] *Biologic false positive reactions to serologic tests for* syphilis in infectious monocleosis are common [1-8] Recently we studied a case in which the initial manifestation was a positive Kahn reaction of high titer in an otherwise asymptomatic young adult male The cerebrospinal fluid also gave a positive Kahn reaction, and the patient underwent treatment for syphilis Admission blood smear showed a slight lymphocytosis and a few atypical lymphocytes (table 1) Other stigmata of infectious mononucleosis were absent Inasmuch as a biologic false positive reaction for syphilis of cerebrospinal fluid had never, as far as we know, been reported in infectious mononucleosis this case was considered one of early, latent seropositive syphilis with possible concomitant infectious mononucleosis [9-11] It was not until numerous serologic procedures for the diagnosis of infectious mononucleosis were reported as positive (table 2) and the *Treponema pallidum* immobilization test negative that we knew the positive Kahn reaction in the cerebrospinal fluid in this instance could not be attributed to syphilis (table 3)

CASE REPORT

A 20-year old white seaman was admitted to this hospital on 21 February 1958 with a diagnosis of syphilis latent early seropositive Prior to admission while undergoing a physical examination for college entrance this otherwise asymptomatic young man was found on two occasions to have positive reactions to serologic tests for syphilis and was transferred to this hospital for further studies The patient had several sexual contacts in October and November of 1957 but never had any symptoms or signs of venereal infection such as skin *erruption genital discharge* or genital or extragenital lesions

Family history and review of systems were noncontributary Past history revealed that the patient had a negative presumptive Kahn in

F m th U S N l H p t l J ck ll Fl Dr S b l ow t M unt Sl i H p t l N w Y rk N Y

Date	Wh cell count per cu mm	Differential count per cent						Hemoglobin grams 00	Hematocrit 00
		neutrophil	lymphocyte	atypical lymphocytes	Monocyte	eosinph	basophils		
	900	46		ew					
2/8-	00								
3/4-	600								46.
-58	200		46						
58									

Date	Sheep erythrocyte agglutination		Serum absorbed with guinea pig erythrocytes		Serum absorbed with guinea pig erythrocytes and beef stroma		Beef erythrocyte agglutination
	Serum unabsorbed	Serum absorbed with guinea pig erythrocytes and beef erythrocytes	Serum unabsorbed	Serum absorbed with guinea pig erythrocytes and beef erythrocytes			
	guinea pig	beef	guinea pig erythrocytes	beef erythrocytes	guinea pig erythrocytes	beef erythrocytes	
	84						
3/4-	896		896				80

Agglutination with the method of Boyden. Titer is the highest dilution of serum showing 2+ agglutination.

TABLE 3 *Results of serological tests for syphilis*

Date	Kahn	Standard Kahn	Quantitative Kahn	Cerebrospinal fluid Kahn	Treponema pallidum immobilization
2-18-58	positive	4			
2-19-58	positive	4			
2-21-58			128	positive	
2-24-58			64		
2-26-58					8
3-14-58			64		
3-19-58			32		
4-21-58		negative			
4-23-58					negative

October 1955 and donated blood in April and June 1956 and in April 1957 at which time serologic tests are assumed to have been negative. He received antibiotics only once in December 1955 at which time he was given injections of 600 mg (600 000 units) of procaine penicillin G on three consecutive days for a furuncle of the right elbow with right axillary adenopathy. The patient had not been ill during the year prior to admission. In the 14 months prior to admission he was seen by physician only twice in August 1957 for smallpox vaccination, triple typhoid and combined diphtheria, tetanus toxoid boosters and in September 1957 for influenza vaccine. The only significant findings in the physical examination were a few small, shotty, palpable cervical lymph nodes

The patient remained afebrile and asymptomatic throughout his hospital stay At no time were hepatosplenomegaly or lymphadenopathy noted On admission his quantitative Kahn was 128 units (table 3) The initial cerebrospinal fluid pressure was 150 mm of water The fluid was water clear total protein was 28 mg per 100 ml globulin was not increased 28 red blood cells were noted on microscopic examination and the Kahn test was positive The differential leukocyte count (table 1) revealed a slight lymphocytosis with a few atypical lymphocytes This suggested the possibility of infectious mononucleosis The heterophil agglutination on the same day was positive At this time although the diagnosis of infectious mononucleosis with a biologic false positive reaction to serologic tests was entertained concurrent syphilis and infectious monocleosis could not be ruled out Two blood specimens for *Treponema pallidum* immobilization tests were drawn and on 27 February the patient was placed on 600 mg (600 000 units) of procaine penicillin G daily for 10 days This course of antisyphilitic therapy was begun principally on the strength of the positive reaction of the cerebrospinal fluid to the Kahn test and the history of sexual contact Negative results of the *Treponema pallidum* immobilization tests were not expected but both (26 February and 23 April) were negative On 28 February the differential leukocyte count revealed a marked lymphocytosis with many atypical forms By 4 March the blood cell count returned to normal The cephalin cholesterol flocculation was transiently positive but by 21 April this as well as the heterophil agglutination test for infectious mononucleosis and standard Kahn had become negative (table 2)

DISCUSSION

We believe this is the first report of a case of infectious mononucleosis in which the cerebrospinal fluid gave a biologic false positive reaction to tests for syphilis The clinical and laboratory findings previously described in this entity are legion Bernstein published an excellent review The occurrence of biologic false positive reactions to serologic tests for syphilis in infectious mononucleosis has been well documented [1] These have been reported in various series as occurring in from 2 to more than 60 per cent of cases It has been thought that the wide variation in the reported percentage of biologic false positive reactions in infectious mononucleosis is explainable by the evanescent character of this finding It has been assumed that if serologic tests were performed more frequently and persistently the incidence of positive reactions encountered would be considerably higher The absence of cerebrospinal fluid giving biologic false positive reactions in tests for syphilis in infectious mononucleosis probably can not be explained by infrequent testing alone inasmuch as neurologic manifestations of infectious mononucleosis occur frequently and many cerebrospinal fluid examinations have been performed in this disease

It therefore must be assumed that this finding is extremely uncommon

On occasion a patient has been found to have both syphilis and infectious mononucleosis During the era of arsenical therapy for syphilis numerous reports of a syndrome identical with infectious mononucleosis were recorded in patients undergoing antisyphilitic therapy [1] This syndrome also has been reported in persons with syphilis not yet under treatment [2] and we believe it is unrelated to the therapy

It is thought that in our patient the negative *Treponema pallidum* immobilization tests adequately ruled out a concurrent syphilitic infection and that the patient had only a single disease process infectious mononucleosis

ACKNOWLEDGMENT The th i d bted o Dr l D d ohn and C L L f th ir h lp n p f mung ar s r l gi p dur d w g th m t l

REFERENCES

1 B t A (B l imo) I f t m l *M dici* 19 85 159 F b 1940
2 B rn t A. (B l m) A b dy p f us m l *J Cl n. Im t gat* 13 419 435 M y 1934
3 B A. (B l m) F l e-p W m inf t m l *Am. J M. S* 196 79 83 July 1938
4 Good g S E F O gl dul f f m l *Pract t er* 127 468-483 O 1931
5 H B W m f t m l w h p f w h ual f f f tur *Am. J Clin. Path* 8 39-45 J 1938
6 Saph W W man e f t m l *Am. J Cl Path* 9 306-310 M y 1939
7 S d k J F J T mpo ly p K h d W m t f t m l port f *J A.M A.* 112 1682-1683 Ap 29 1939
8 K ufm R E F l p l g f yph l f m l *J Lab & Cl n. M d.* 26 1439-1446 Jun 1941
9 Wh E C. Ly ph d b g d m l t g l k m a. *U S Nav M B ll* 22 302 307 M 1925
10 B ldr dg C. W R h F J and H m G H Gl d l f (f t m cl) *Ar b Int M d.* 38 413-448 O t 1926
11 E m y G d Put h W Ub d lymph m d D f b (Gl ma) d E kr k g m äh I h m Bl b ld (E B tr g ur h m l g h M thod k) *Zt hr f kl n. M d.* 120 272 312 1932
12 F l y D L A ut f m l s M. *Cl n. N th Amer* 21 1139-1151 J ly 1937
13 Zaraf C J D O ur f f m I d yph l me d d l *Ann. Int M d.* 38 1053-1057 M 1953
14 Da d h I T f f m l *Am. J CL Path T h Supp* 2 56-60 M 1938
15 W ll D Üb d er l g h D g d nf kt M kl h P l Bun ll mi d f rm rt H mm l ryth yt *Ztschr Immunitat for h* 112 290-308 N 1955
16 P E T W lf d R L d Fig W G O ll h m lys f us m l d h di *Am. J M d.* 21 193-199 A g 1956

TWITCHELL PROMOTED TO MAJOR GENERAL, BEDWELL, BRUA AND MORHOUSE GET STARS

Major General Harold H Twitchell command surgeon of the United States Air Forces in Europe recently received his second star and Brigadier Generals Charles H Morhouse Theodore C Bedwell Jr and Robert S Brua USAF (MC) have been promoted from the rank of colonel

General Twitchell was surgeon of the Continental Air Command *Mitchel Air Force Base New York* prior to his assignment in Europe From 1953 to 1955 he served as director of professional services in the office of the Air Force surgeon general He is a 1929 graduate of the University of Vermont School of Medicine and a former commander of Tripler Army Hospital



Ce Tw tchell



Gen B dwell



Gen B ua

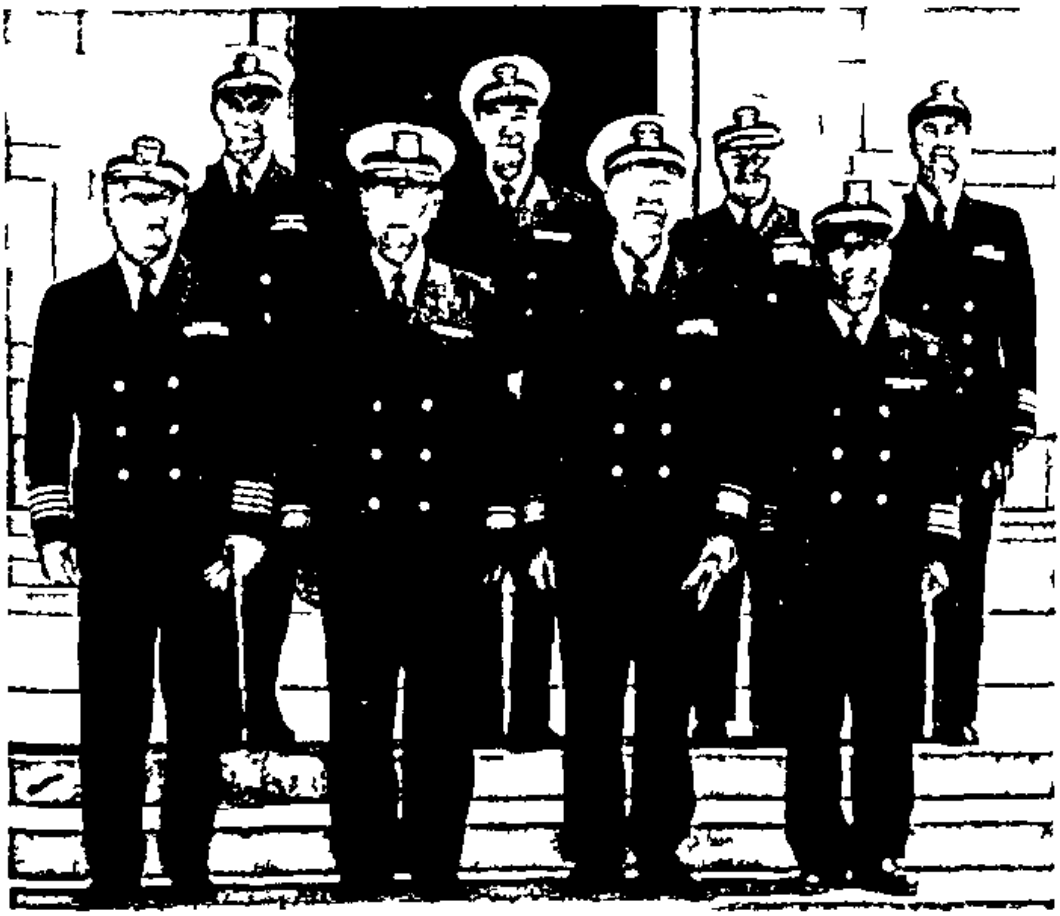


Ge Mo hou

General Morhouse was recently appointed Surgeon of the Fifth Air Force in Japan after serving as surgeon of the Air Proving Ground Command Eglin Air Force Base Florida At the fall of Bataan during World War II he accompanied General Douglas MacArthur by submarine to Australia where he served as aide de camp and personal physician from March 1942 to 1945 He is a 1933 graduate of the University of Vermont School of Medicine

General Bedwell has been deputy surgeon of the Strategic Air Command Offutt Air Force Base Nebraska for the last three years Previously he was chief of the preventive medicine division office of the Air Force surgeon general He received his medical degree from Baylor University Medical College in 1933 and master of public health from Johns Hopkins University in June 1951

General Brua has served as chief of the medical inspection division in the office of the Air Force inspector general Norton Air Force Base California since August 1957 He formerly was surgeon of the Western Air Defense Force Hamilton Air Force Base California A graduate of Washington University School of Medicine in 1931 he is a specialist in orthopedic surgery



JAPANESE NAVY SURGEON GENERAL Re r Admiral Yuk ni Abe Surgeon General of the Japanese Navy J S D F (first row sec nd fr m left) is hown during h s recent tour of the fac l ti s at the N ti al Nav l Medical Center in Bethesd Md Stand ng w th him left to right are (f t row) Rear Adm ral Fr k P Kr uz Jr MC USN ommandi g offic of the U S N v l Hospital Rear Admiral Thom s F Cooper MC USN command ng officer N tion l N val Med cal C nter and Capt in Ish da Nav l Attache Japan se Emb ssy (Second row) C ptain Otto Van Der Aue MC USN com manding offic r Na l M dical Res arch In titute Captain Er c G F Pollard DC USN commanding ff cer U S Na al D ntal School Captain Lester J Pope MC USN commanding officer U S N val Medical Sch ol a d Command Cal in F Joh son MSC USN com manding offic r of the U S Naval Scho l of Hosp tal Adm nistrati n

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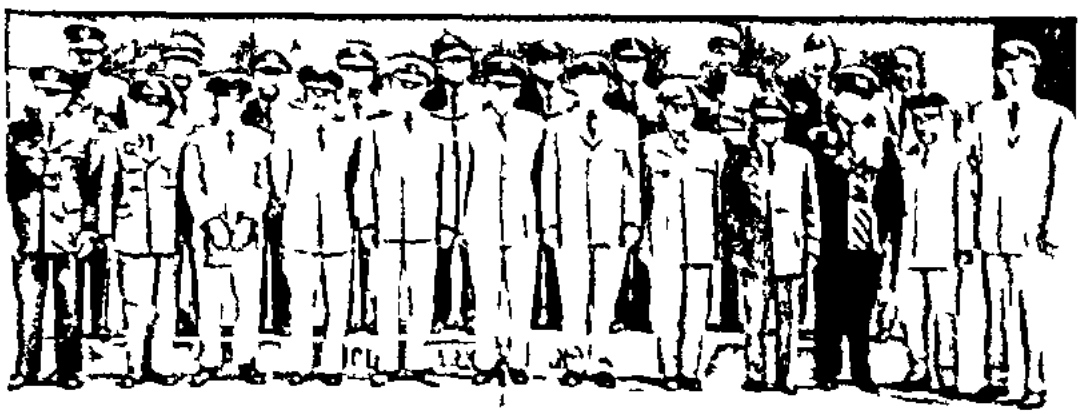
WALTER REED TO INSTALL NUCLEAR REACTOR

A 50 000 w t nucle energy reactor fo biologic l r search nd m d c l tr tm nt ha b en desig d for Walter Reed Army Institute of R h by Atom Internat nal under n agr ement with the Army Corp of Eng d w ll be i stall d sometime next summer

AIR OFFICERS OF 16 COUNTRIES GUESTS OF GEN NIESS ON USAF MEDICAL TOUR

The surgeons general or senior medical officers of 16 foreign air forces were the official guests of the U S Air Force for a tour of selected medical facilities following the recent annual meetin of the Aerospace Medical Association in Los Angeles They were escorte d by Major General Oliver K Niess surgeon general of the Air Force

The group visited the U S Air Force School of Aviation Medicine Randolph Air Force Base Texas Lackland Air Force Base Texas Maxwell and Gunter Air Force Bases Alabama the Aero Medical Laboratory Wright Patterson Air Force Base Ohio and the Armed Forces Institute of Pathology Washington D C where the ac companying photograph was taken



Fir t ou (l ft to ght) Col Marc al B eza deputy dir ctor f med cal serv ces Ch l an Air F ce M j Gen. Yasuo Ohmur J pane S lf D fense Forc Maj Park Kyo g Wb R publ c of Kor a A Fo ce Brig Gen. Chang Duk Sung surg on ge er l R p bl c of Ko a A Fo ce Capt W ll am M S ll phant dir ctor Armed F rces I t tute of Pathology Maj Gen Oliver K N surgeon general U S A l C l F ank M Toun nd d puty dir ctor AFIP Brig G n Raul Terr s Pr to general M x an A Fo Col P l gio G Potenc ano a surg on g er l Air Forc Col F tz D ener G rman A Forc Republ c f W Chang Pyung Kun Republ c of K a Air For C l Clyde C e ort off er S cond w (l ft to ght) Brig Gen. C Parag ayan Armed Fo M d l S rvic M j Raph l B Fo c C l Ol mpo M l a Ch l an A Fo Maj G n L Kat o l st Ch e A Forc Capt Humberto S gundo l \ Fo ce F t Lt Alberto d l Cast ll y Guerra Cuban Air V cent Olg m dir ctor gene l h lth serv ces A g Bau mm Su l st tut of A at on M d cin Lt Col Am A F c Dr H V lard U ver ty f East Med cal S houn tbe p ctur are A Commodore A A. G Corbet serv c s (Air) Royal Canad an A Forc Wing Comd Staff Wash gton M j H bertus Grunbofer German A ur g on gener l Impe al I an an A Forc and A d puty surge n ge er l Royal Tha A Force

DR STOWELL NAMED AFIP SCIENCE DIRECTOR



D St w ll

Dr R bert E St well director of cancer r search nd professor and ch man of the dep rtment of pathology nd onc logy Uni versity of Kan as Medic l Center fo the past 11 year h s b n appointed sc entific direct r of the Armed Forces Institute of Path logy H ucceed Erne t E G odpa ture who res gned 10 Ap il 1959

Dr Stowell has be n a membe of the Scientif c Adviso y Board f Consulta ts for the Armed Fo ces I stitut of Pathology f r th l t three y ars nd i curr ntly pr d nt of th Inter n t nal Ac d my of P th logy nd cha ma of the I t ci ty Committee fo R search P tent l n Pathology H author o o uth of many publi hed c ntific p per A native f Ca hme e Washingto Dr Stowell was gr duated from St nfo d Un versity School of Med ci e in 1940 nd c v d the degree of doctor of philos phy n p thol gy f om Washington University in 1944 P to coming to the University of Kan a he taught t the W h ngton U iv r ity School of Medici e and rved as assist nt p th l g t at se ral hospitals n St Louis

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NEW FORBES AFB HOSPITAL Opened in M rch th s new 100 bed A Fo ce ho p t l t F rbes Air Force Base Kan as will provide services a at n m d e general medicine gener l surgery ob tetrics and gynec logy ped tr c and r diology Colo el Jack F Burn tt USAF (MC) mmanding ff cer of the hospital

Progress Notes

Dr Frank B Berry Assistan Secretary of Defense (Health and Medical) was recently notified by Ambassador Herve Alphand of France that he has been made a *Chevalier* of the *Legion d honneur* the French order of knighthood "as a token of the French government s great appreciation for the sentiment shown for France on many occasions" The American Urological Association is offering three prizes totaling $1 000 for essays submitted before 1 December on the result of clinical or laboratory research in urology Urologists who have been graduated not more than ten years hospital interns and residents doing research work in urology are eligible The executive secretary William P Didusch 1120 North Charles Street Baltimore can provide details The April 1959 issue of *Medical Annals of the District of Columbia* was a special Walter Reed Army Medical Center number with scientific articles contributed by members of the medical center staff Brigadier General Francis W Pruitt MC USA chief of the department of medicine was consulting editor Authors were the following Medical Corps officers Colonels Benjamin H Sullivan Jr and Ogden C Bruton Lieutenant Colonels Donald L Howie William H Crosby Jr James B Hartgering and Hu A Blake Major Michael P Dacquisto and Captains John E Meyers Jr Marcel E Conrad Jr Harold S Ramos and Edward J Kamin III Rear Admiral Bartholomew W Hogan Surgeon General of the Navy was recently appointed North American chairman of the Pan American Medical Association s section on military medicine Major General Otis O Benson Jr USAF (MC) commanding officer of the U S Air Force School of Aviation Medicine Randolph Air Force Base Texas has been appointed chairman of the new section on space medicine Lieutenant Colonel Ellis Arkus MSC USA succeeded Major James A Leddon Jr MSC USA as commanding officer of the 52d Medical Battalion Seventh U S Army Europe on 8 May 1959 Major Leddon commander of the 52d Battalion since August 1956 has been assigned to Fort Meade Maryland as a member of the 68th Medical Group Former chief of the aviation pathology section Armed Forces Institute of Pathology Dr Vernie A Stembridge was recently awarded the Legion of Merit for his services at AFIP from February 1956 to January 1959 while on active duty as a major in the U S Air Force Medical Service Dr Stembridge is associate professor of pathology at Southwestern Medical School Dallas Texas Major General James M Epperly DC USA Army Dental Corps chief recently returned from a three week tour of dental installations in the Far East including an inspection of facilities of the U S Army Advisory Group in Korea Rear Admiral Frank P Kreuz Jr MC USN commanding officer of the U S Naval Hospital in Bethesda Maryland was promoted to flag rank in April At Fort Benning Georgia Robert M Hardaway III MC USA chief of the general surgical service at Martin Army Hospital was recently

promoted to the rank of c lonel Th rty members of th Army Medic l Sp c list Corps ttended the co ps ninth semiannual in-st tute for fficers 10 16 M y at Walter Reed Army Medical Center C ptain **G rtrude Mu ray** AMSC W lter Reed Army Hospital was cour director and the chi fs of sections of th Army Surgeon Gener al s office c nducting worksh p progr ms w re Lieutenant Colonel **Helen M D vis** d etitian sectio Lieutenant Colonel **Myr L McD niel** occup tional ther pi t sectio Li tenant Colonel **Barb ra R Fri** phy c l the pist sect n Colonel **Will am F Pati nt** USAF (MC) has been ass gned as surge n of the Alaskan Air Comm nd succe ding B igad e General **J hn R Cope haver** USAF (MC) now surgeon Tacti al Ai Command Langley A r Force B se V rg ni Capt n **Lynn S Be ls Jr** MC USN retired 1 April after more than 20 yea s of active naval service *H* last duty assignment was as senior psychi trist at the U S N val Hospit l Ch lsea Ma sachu-setts N val medical officers retiri g in M y include Rear Admir l **John Quincy Owsl y** inspe r r of n val medical act vities Pacif c Co st Headqu rte Western S Frontier nce 1958 fter n val career of mo than 34 year Capta n **Geo g H Raines** aft r more th n 28 ye s n th Navy who was serving as h d of the neuro-psychi try branch Bure u of Medicin nd Surgery Captain **Thomas M M nley** N val Ai Statio Minne polis Minnesota after 17 ye rs act ve ervi Capta n **H rm n A G oss** aft r 30 years s rvice U S N val Dispen ry S n Fr ncisco Capt in **John F Foertne** xecut ve off cer and chief f adi logy U S N val Hosp tal Pensa c l Florida fter more th n 22 yea serv ce and Captain *William* R **Whit ford** U S Nav l St tion Long *Beach* Califo n a who will l ve the N vy aft r more tha 30 y rs Colonel **Jam s P Papp s** MC USA ha been named s speci l ass stant for combat development to th Surgeon G neral of the Army He will direct the activ t es of the Army Medic l Service combat de elopment group organ zed 6 Ju e wh ch w ll work with other combat de el pment agenc es to assur med cal uppo t f r the Army in the field Captain **L o J Elsasse** MSC USN ch f f th N vy Medical S rvice Corps recently add e sed classes in hospital administrati n at the graduate school of the St te University of I wa and Univers ty of Min esota Drs **P t r St rett** and **Wa d St rrett** dent cal twins from Auro a Illino s were simultan ously commissioned first l eut n-ant n the A my Med cal Corps Reserv 3 M y 1959 They re 1956 gr duates of th Uni rsity of Ill nois M dical School They are as f r a is known th first dentical twins to receiv simultane us rv omm sions in the A my Lie tenant Colonel **Frederick W H t g** MSC USA h s been ppointed assistant chief of the med c l f l e b a ch n the off ce of th Surgeon General of th Army Capt **Elm r R K ng** MC USN di ect r of the department of nu l m d i and C mmander **Willi m McFarl nd** MC USN cl nic l h m tolog t U S Na l Hosp t l Bethe d Maryland we e m g th sp k r t a ympo m o Acute R d ati Syn d ome 9 M y L t n nt Comm d r **Egg rt P tersen** Coordi

nator of Psychological Training Royal Danish Navy began a two month orientation and training visit in the United States to study the Navy s psychological program 11 May Commander Petersen is the second foreign naval officer invited to the United States this year to observe the Navy s work in psychology Commander **Per Jorem** chief psychologist of the Royal Norwegian Navy made a similar tour in March Lieutenant **Raymond E George** DC USN U S Naval Air Station Brunswick Maine presented a clinic on Cricothyroidotomy at the meeting of the Maine State Dental Society 19 June in Rockland Captain **Raymond H Bishop Jr** MC USA will be the Atomic Energy Commission licensed physician operating the new radio isotope clinic at Martin Army Hospital Fort Benning Georgia The Commission is expected to approve the facilities for treatment there by the end of July which will enable the clinic to obtain radioactive isotopes and other supplies Commander **Nell Seroka** NC USN will succeed Commander **Mary J Lindner** NC USN as chief of nursing service at the U S Naval Hospital Yokasuka Japan Commander Lindner retired 1 May after more than 23 years of service

Major General **Jack W Schwartz** MC USA commanding officer of Tripler Army Hospital since April 1958 was recently promoted to his present rank Prior to his assignment in Hawaii he served at Madigan Army Hospital Tacoma Washington and at Walter Reed Army Hospital Captain **Benjamin W Oesterling** DC USN staff dental officer Fleet Marine Force Pacific was a guest essayist at the 12th District Dental Society meeting at Lake Shasta California 9 May Colonel **Edwin J Pulaski** MC USA chief of general surgical services at Letterman Army Hospital San Francisco is vice president at the First International Symposium of Anti Infectious and Antimitotic Chemotherapy to be held in Geneva Switzerland in September The only U S Army physician to attend the symposium he will represent the Army surgeon general s office Colonel **Harold V Ellingson** USAF (MC) director of education and plans U S Air Force School of Aviation Medicine since 1957 succeeded Colonel **Fratis L Duff** USAF (MC) as commander of the Gunter Branch of the School of Aviation Medicine Gunter Air Force Base Alabama on 1 July Colonel Duff has been assigned as deputy surgeon U S Air Forces in Europe

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MEDICAL MISSILE OPERATIONS COURSE

A ten day course in the medical aspects of missile operations will be conducted for 25 students from the military services at Patrick Air Force Base Florida 14 24 September 1959 The course designed to train personnel in the field of medical and occupational health problems occurring in missile launching operations is offered five times each fiscal year It will be given again 9 19 November

Officers Certified by Specialty Boards

The surgeons general of the military medical services have announced that the following regular Medical and Dental Corps officers have been certified by the boards indicated

American Board of Anesthesiology

M ha F k L C p USAF

American Board of Internal Medicine

D N h M M j USAF

American Board of Oral Surgery

Alb gh C l R M j USA
F ll G g E J L C l USA
Marl tt R b H L C l USA
Sm P l W C p USN
W g d F d k T C p USN

American Board of Pathology

Pathologic Anatomy

Sm h M l J M j USAF

American Board of Pediatrics

N h l Warr W C pt USAF
T yl l w T Cap USAF

American Board of Periodontology

Al der P rry C Lt C md USN
R ph l Alf d L C p USN

American Board of Psychiatry and Neurology

Neurology

Hood Rob rt F M j USAF
K us F an J M j USAF
S hw mb H lb H M j USA
T us B l L C p USA

American Board of Radiology

M t Sherm H C p USAF

Medical Nuclear Physics

Dun g W ll m A Cap USAF
H l Ca l R C pt USA
M Sh rm H Cap USAF
R L d S Capt USA

American Board of Surgery

Holl g w h Cha l E L Col USA
P rryk L C C pt USAF
Woo l y H mer E J M j USAF

Thoracic Surgery

Hood Rich d H J M j USAF
Th m D d E Lt C l USA

A Message From the A M A

This month we will consider the types of membership in the American Medical Association and the services available to members There are five types of membership in the Association which is a federacy of constituent state and territorial medical associations with the objective of promoting the science and art of medicine and the betterment of public health

Active Members are those members of constituent associations who hold the degree of Doctor of Medicine or Bachelor of Medicine and who are entitled to exercise the rights of membership in their constituent associations including the right to vote and hold office Active members are of two classes dues paying and dues exempt Members may be excused from the payment of dues while serving in an A M A approved intern or residency training program while temporarily in the Armed Forces because of financial hardship on retirement from active practice and on reaching the age of 70

Associate Members are those who hold the degree of Doctor of Medicine or Bachelor of Medicine but who are ineligible for active membership in their constituent associations because of local membership requirements

Affiliate Members are those in the following categories who are nominated by the respective approving agency and elected by the A M A House of Delegates physicians who are members of chartered national medical societies of foreign countries adjacent to the United States as well as American physicians in foreign countries engaged in medical missionary and similar educational and philanthropic work must be approved and nominated by the A M A Judicial Council dentists who hold the degree of D D S or D M D who are members of state and local dental societies must be approved and nominated by the Section on Laryngology Otology and Rhinology pharmacists who are active members of the American Pharmaceutical Association must be approved and nominated by the Section on Experimental Medicine and Therapeutics and teachers of medicine and allied sciences who are United States citizens and who are not eligible for membership through constituent associations must be approved and nominated by officers of a section

Honorary Members are physicians of foreign countries who have risen to pre eminence in the profession of medicine and who while attending a meeting may be elected at that meeting to such membership by the A M A House of Delegates on the nomination of the Board of Trustees

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F m h C n l N t l D f f h Am r c M d l Ass t Th
w d p p d t ly th of th D p tm t f D f
—*Ed t*

Assoc te aff l ate a d honorary members enj y the priv leges of the Scientific A mbly without the right to v te or hold off ce Such members do not pay m mb rship due

S rvice Members include all regular commission d medical off cer d comm s i ed medical officers of the reserve component on ex tended active duty with the Un ted St tes Army N vy A r Fo ce nd Public He lth Serv ce who have b en nominated by th Surgeons Ge er l of the resp ctive services as well as th permanent medical officers of the Veteran Administration who h v be n nominated by th ch f med c l director All n minees mu t be approv d by tl e A M A Jud c l Cou cil Serv ce member ret n memb rsh p as long as they re on ct v duty and the eafter f etired p o ided th y do not e g ge in active p act Serv c members do not pay du s

The total membership of 177 000 represents 90 per cent of the nation s practicing physicians There are 151 876 active members of whom 10 365 have been exempted from payment of membership dues There also are 6 170 associate 280 affiliate and 88 honorary members

The service membership total is 18 875 of whom 4 686 are in the Army 3 783 in the Navy 3 860 in the Air Force 1 803 in the Public Health Service 3 839 in the Veterans Administration and 911 military retired

Only active and service members are eligible to acquire voting and office holding privileges in the A M A

The annual membership dues of $95 include the subscription to *The Jou nal of tne American Medical Association* or one of the A M A specialty journals and the *AM 1 News* the biweekly newspaper of American medicine Dues will be remitted 1 January or 1 July following the date of entry on active military duty to all members of the Armed Forces and the United States Public Health Service irrespective of exemptions for local dues

While only dues payin, member receive complimentary copies of the specialty journals the *AMA News* is sent gratis to all Association mem l ers regardless of type of membership However, the *J A M A* and some of the specialty journals are available to service members at most military Public Health Service and Veteran Admini tration hospitals Moreover A M A publi cations are available on individual subscription by service members

The followin, are some of the many benefits of membership in tl e American Medical As ociation (1) Participation in two huge post raduate meetings annually where leading medical men re port on medical advances show scientific exhibits newest films and medi al TV (2) Per onalized information services on new drug s tl erapy and research foods and nutrition physical

medicine, cosmetics, pesticides, poisons, and medical quackery (3) Individualized library reference and medical periodical lending services (4) Research project opportunities and small grants (5) Personalized information services on socioeconomic medicine, medical legislation and medicolegal problems, (6) Physician placement service and counseling on practice management problems (7) Educational material for patients (8) Representation to the Congress of the United States and (9) Question and answer consultation service conducted by medical experts via *J A M A*

In addition the following personal services are available to all members on request information about physicians income tax returns, doctor placement help, data about a specific drug or class of drugs, standardized insurance claim forms practice management information physician hospital relationship guidance bibliographies and information on various forms of medical practice guides for evaluating indigent care plans latest findings on nutrition in pregnancy or fat in the diet in relation to disease, a run down on a suspected medical charlatan a list of internships and residencies offered annually a set of medicolegal forms for your practice health education literature for your patients, a guide to physician participation in radio and TV broadcasts, a list of postgraduate courses offered to physicians around the nation information on the medical aspects of alcoholism and drug addiction data on workmen s compensation laws and prompt help with nearly every problem you encounter in your practice

All members of the Association are encouraged to avail themselves of the benefits and services of membership When in Chicago all members are invited to visit the Association s headquarters

DEATHS

VEIGEL Leste Paul Colonel USAF (MC) of Wint Park Fl g ed s surg n of W t n Air Def n e Fo ce H milt n A F rce B e C lif gr duated n 1931 from No thw t n Un ve ty Med al S hool Chic go Ill appo ted a fi t l utenant n the Army of the U t d St t s 4 Nov mber 1932 ported fo active duty 10 D mb r 1932 commi sioned a first lieuten nt in the U ited St t s A my on 1 July 1933 tra fe r d to the Un t d Stat A r Fo ce on 22 July 1949 d d 3 J 1959 g d 54 Hamilton A Force B s of co on ry art r o le o

ZUCKER Jo ph St nl y S ond Lieutena t AFRe (MSC) of Spri gfield Ohio a ig ed to 3575th U S Air For e Ho pital Vance Air Force B se Okl graduat d n 1952 from Ohio St t U iversity appointed a s cond l utena t in the Unit d St t A Fo c Re r on 30 June 1956 reporte fo ti e duty 23 O t be 1958 d d 25 March 1959 aged 29 near Morril e Ark as a sult of a m l t ry aircr ft accident

Book Reviews

LONG-TERM ILLNESS MANAGEMENT OF THE CHRONICALLY ILL PA TIENT d t d by *M ch l G W bl* M D w th 79 b 748 p g llu t t d W B S d C mp y Ph l d lph Pa 1959 P $17

The authors propose to pres nt in one volume comprehensive urvey of the management of individuals afflicted with prolonged illness This is dmirable and p rt of the goal and achievement of the several e t blished textbooks of medicine the rem ning p rt b ing the management of acute and if p operly d gnosed and effec tively tr ated tran ent llness The book s divided into two parts The fir t is devot d to organizational institution l c mmunity resource m tters on both the small a d gr nd scale As epitomized by the Vet erans Administr tion reh bilitation centers and obtainable only by m ans of the massive f nancial support of the F deral Government the gr nd scale concept must m in a dream for ll but few indi duals in a few commun t es On the mall sc le the home is the *locus regimenti* to which the physic an is urged to b ng fa th h pe *char ty opt mi m and sandbag f r pr gressive resistance e ercises* It exhorts physicians to h ve understand ng and encouragement for those whom they cannot s yet cu e The tyle in much of th s portion is crusading wh h is irrit ting to this r der as it attempts to gener ate n tt tude th t can be assumed on the part of ny qualif ed reader of the book and thus wastes time and pace better dev ted t the pr cticalities of reh bilitation O e feels that the authors display an element of r t onalization here fo th title they ha e chosen To pass to the second port on of the book which represents 85 per cent of th volum is ref esh ng Th t the nerv us afflictions are g ven gene ally more scanty treatment and only l ghtly more space th the endocr ne sy st m th t o thoped cs exclus ve of a superb chapter on medical ther py of h umatic disorde nd gout is con ta ned in 28 pag s and osteoarthritis dism ssed on one h lf page of a 705 p ge volume will surprise many Th coverage of the material in the bo k is u even and tak g that which is felt to be j stifiably included s our y rdstick t is difficult to justify the omission of so many eq ally prev lent or more pre alent diseases For example lep rosy i given 5 p ges while mala ia and a host of prev le t chro ic lb t tr pical d ses are omitted altogether Typho d nd its car ier problem re not me tio ed Rh matic and cong n tal heart dis se in wh ch such str des ha e r cently been made are cove ed in 16 pages and not phr se is d oted to the problem raised by reprieve f om sentence of nv l d m nd early de th This book conta ns a few very well d ne ss y b t much th t is unreward ng t the re d r The b bliography s cu ent nd adequ t in me ch pters but in others consists only of the mechanical li ting of the authors pre us pub- licat ons —*ROBERT E D FOREST Li MC USN*

STAPHYLOCOCCUS PYOGENES and its Relation to Disease by *Stephen D Elek*, M D D Sc Ph D D P H 767 pages illustrated The Williams & Wilkins Co Baltimore Md 1959 Price $15

The publication of this volume classified by the author as a monograph is indeed timely for both clinicians and microbiologists a wealth of information is provided The text is divided into 15 chapters progressing from a historical survey through various qualities and characteristics of staphylococci and finally presenting clinical problems of staphylococcal infection In addition to a subject index and an authors index there is an extensive bibliography of excellent references for source material This volume is well organized the text is clearly presented and is effectively illustrated with tables figures photographs and reproductions of electronmicrographs The book is attractively bound and the contents provide easy reading there are a few though minimal errors in typography and composition Although there may be those who would disagree with some of the statements and philosophies of the author such a possibility should not detract from the value of the book This volume is highly recommended for reading and reference by clinicians researchers microbiologists and others who need to be well informed in the many aspects of the current world wide problems of staphylococcal disease

—*LAVERNE A BARNES Capt MSC USN*

PRELIMINARY RESULTS OF SCIENTIFIC RESEARCHES ON THE FIRST SOVIET ARTIFICIAL SATELLITES AND ROCKETS Compilation of Studies Performed during the international geophysical year 1957 1958 Academy of Sciences of the USSR Moscow Russia 1959

This recent volume presents some of the Russian contributions in space research to the program of the International Geophysical Year It contains three articles written in Russian but with brief English summaries Of major interest is Medico-biological Studies on Rockets which comprises one third of the book The Soviet animal capsules and their methods for the utilization of oxygen and the removal of carbon dioxide are described There is a discussion of the photography and reactions of the test animals in rocket flight of 100 to 212 kilometers including the effects of acceleration and weightlessness The time of the flights varied from 50 to 60 minutes during which the animals were subjected to weightlessness for periods ranging to 3 minutes Complete or partial periods of weightlessness produced lowering of arterial pressure and decreased pulse rates No changes were observed in behavior or in the physiologic functions of the animals nor in the pigmentation of the skin or fur which could be considered to be due to cosmic radiation during the flight Examination of the animals for a period of from 6 to 7 months after the flight was negative from the standpoint of changes in health and behavior Several of the chapters are well documented and contain many references several of which are of American origin

—*PAUL A CAMPBELL Col USAF (MC)*

VASCULAR SURGERY by G d T k t M D M S F A C A 726 p g ill t t d W B S und C Ph lad lph P 1959 Pr $17 50

In the preface of this volum D de T kats states that in the ar as wh r technic l ad nces re most f qu t there is th g eate t ne d for a t tement of fund ment l prin iple There must emain a home ba e a foundation of bas c fa t which do not change even though th ir nt rpr tat on may h v to be modif ed f om tim to time In this monogr ph he p esents succin tly and a curat ly the b sic facts of v scular surgery but there is n c di c or card otho acic s bject discussed unles it bears on pe pher l circulation The volum is di d d in four part Fu d ment l Pr c ple Affecting V scul Surg ry Method of D ag s Vascular Sy dr me Req iring Su g c l C e and Surg l Technique Each ct n s complet w th cr ss indexes to other sections and volum u reference Fo the pr c titioner or student of vascular urge y the volum i pl te with the kn wl dg and t h c f thi p e m n t pecialist in th field and is highly recommend d fo d g and referenc

—*FELIX P BALLENGER C pt (MC) USN*

THE YEAR BOOK OF OPHTHALMOLOGY (1958 1959 Y B k Se) d d by *D rr k V l* B A M. D D Oph (O) F A C S F R C S (H) 407 p g ll t t d Th Y B k P bl h I Ch g Ill 1959 P $7 50

Th urr nt volume of th s se ies as valuable a its predece sors It rves as a qu ck and eady referen e source for the busy ophthal mologi t The mate l s again divided i logical rr ng m nt Thi r view of art cl s in th w rld s ophth lm c l ter ture is made ev n more v luable by the te ccurat and occasi nally humo ous comments by ts editor Dr Vail Th s volum c ntains a go d special article on r cent adva ces in the diagnosis and medic l therapy of chron c s mple gl ucoma by Dr Be nard Becke Illu t ation are not profus b t re w ll lected nd ad qu te The volume w ll in- dexed Ophthalmolog sts who h ve purch ed thi book in past y ars w ll find the present v lume fully up to th stand ds t by it pred pces ors —*VICTOR A. BYRNES B g Gen. USAF (MC)*

SELF DESTRUCTION A S dy f th S d l Imp l by *B l b Ch mb l B Im* M D 94 p g Ch l C Th m P bl h Sp ing f ld Ill 1958 P $4 75

Th oc l and emot n l b ckg ound of self dest uction is ex min d n le s th n 100 p ges Thi i well don b t th p llid se ies f c se h t es eem to m s the po nt Dr Bos elman is content t llum n t the dark pl ces wh r suicid s f d a d makes no att mpt to di u s the mo e contr ver l t atment aspects exc pt to give the impression that p ychotherapeutic me ure are th only ones P ges 16 th o gh 20 conta n short appe ling outli es f vari us f m ly situ t nd th ir lo g term emot al eff cts Th s

four pages of psychologic leavening are worth looking up and reading during the next trip to the library The book is recommended to those with a special interest in suicide as a medical or social problem

—PAUL F EGGERTSEN Lt Col USAF (MC)

PHYSIOLOGY OF MUSCULAR ACTIVITY by Peter V Karpovich M D M P E originally by Edward C Schneider M P I Ph D D Sc 5th edition 368 pages illustrated W B Saunders Company Philadelphia Pa 1959 Price $5

This fifth edition of a book well known to everyone engaged in teaching and research of physical education and physiology of exercise is the first to be published since the original author s death in 1954 Dr Karpovich has made new valuable contributions to the book The physiologic phenomena during physical activity are thoroughly discussed in twenty one chapters and the reader is given much information on such topics as energy cost of various activities fatigue and staleness health physical fitness and age physical work in relation to external temperature and ergogenic aids in work and sports Although more than 500 original reports of experimental research have have been incorporated in the text many of the conclusions and statements carry his very personal note This is natural in such a field research and is stimulating for an exchange of thoughts In some instances however our knowledge has progressed further than presented in this book Generally the text as well as many fine illustrations and tables reveal an abundance of interesting material The book offers not only guidance for the biological thinking of instructors and students in physical education but of medical students medical practitioners and specialists and of medical service officers as well

—BRUNO BALKE M D

A PRACTICE OF THORACIC SURGERY by A L d Abreau O B E Ch M F R C S 2d edition 619 pages illustrated The Williams & Wilkins Company Baltimore Md 1959 Price $19

The second edition of this textbook is more comprehensive than the edition published in 1953 It is divided into seven major sections ranging from anatomic and physiologic considerations to thoracoabdominal surgery The material presented is aimed to acquaint the reader with the current practices in thoracic and cardiac surgery The author is to be complimented for illustrations of the technic of postural drainage which is not generally appreciated The section devoted to pyogenic infections is clearly written in such a manner as to facilitate appreciation of current concepts regarding lung abscess and bronchiectasis The surgical aspects of tuberculosis are outlined and the discussion of both resection and collapse therapy is sound The discussion of pulmonary malignancy is concise and the appraisal of treatment results is presented frankly The discussion allotted to congenital heart diseases follows the general pattern however those sections dealing with angiocardiography and cardiac catheterization are clearly presented for ready understanding by the surgeon

A MANUAL OF ANAESTHETIC TECHNIQUES by *W ll m J Pry* M D Ch B (N Z) F F A R C S (E g) D A (E g) F F A R A.C.S with f w d by *J H T Cb ll* M R C S (E g) L R C P (L d) F F A R C S (E g) D A (E g) 2d d t 228 p g ll t ted Th W ll m & Wilk s C B ltim Md 1959 Pr $7

GENETICS RADIOBIOLOGY AND RADIOLOGY PROCEEDINGS Mid W t C f by *W d ll G S tt* M D Ch man d *T t E* Ph D Co-Ch rm 149 p g ll t t d Charl C Th m P b l h r Sp gf ld Ill 1959 P $5 50

PHYSIOLOGY OF CARDIAC SURGERY Hyp h m E t p l C c l nd E t p l C l ng by *F k G ll* M D 96 p g Ch l C Th m P bl h Sp ingf ld Ill 1959 Pr $4 50

THE INNERVATION OF MUSCLE A B p y Study by C C M D d *A. L W ll* M D 149 p g ll t t d Ch l C Th m P b- l h Sp gf ld Ill 1959 P $9

BRONCHOGRAPHY by *C D jk t* M D 157 p g ll t t d Ch l C Th m P bl h Sp ingf ld Ill 1959 P $9 50

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Fleming A Young M Y Suchet J and Rowe A J F Penicillin content of blood serum after various doses of penicillin by various routes *Lancet* 2 621–624 Nov 11 1944

Cabot R C Pernicious and secondary anemia chlorosis and leukemia In Oler W (editor) *Modern Medicine* 3d edition Lea & Febiger Philadelphia Pa 1927 Vol 5 pp 33–100

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Appendectomy Incision in Women

Mouth To Mask Resuscitation Device

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SERVICE ARTICLES ☆ REVIEWS OF NEW BOOKS

CLINICOPATHOLOGIC CONFERENCE ☆ CASE REPORTS

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Monthly Message

Many times it has been said that somewhere in the writings of Lenin there is a statement that it will be easier and more effective to bankrupt the United States through economic meas ures than through a hot war In order to verify this rather loose quotation I wrote to Mr L Quincy Mumford Librarian of the Library of Congress to ask if it were true He replied that The Library staff has been asked on many occasions to verify a state- ment attributed to Lenin about driving the United States into bankruptcy " They have never been able to find such a statement

The closest reference we found is a passage in Lord John Maynard Keynes book *The Economic Consequences of the Peace* (Harcourt Brace & Company New York N Y 1920) pp 235 236 which reads

> Lenin is s id to have decl ed that the best way to destroy the Capital st System wa to d bauch th currency By a continuing process of nfl tion govemment can confiscate secretly and unobserved n important part of the wealth of their citizens By this method they not only confi cate but they confiscate *a b tr rily* and hile the process impoverishes many it actually enriches some The s ght of thi arb trary re rrangement of riches strike not only at s curity but at confidence in the equ ty of the existing d t ibution of we lth Those to whom the system br ngs windf lls beyond th r de erts and even beyond their ex pectations or d s es becom p f teers who re the object of the hatred of th bourg oisie whom the nflationism has im po er shed n t less tha of th proletar at As the inflati n p o- ceeds and the al value of th currency fluctuates wildly from month to month all pe manent rel tions between debtors and creditors wh ch form the ult m te found tion of capitalism becom so utterly diso dered as to be lmost meaningless and the process of wealth getting deg n r tes i to a gamble nd a lottery Len n was certainly ri ht

In this statement again there appears the common Lenin is said type of quotation and the last sentence in Lord Keynes paragraph implies acceptance of the truth of the statement

Frank B Berry

FRANK B BERRY M D
Assistant Secret ry of Defense
(Health and Med cal)

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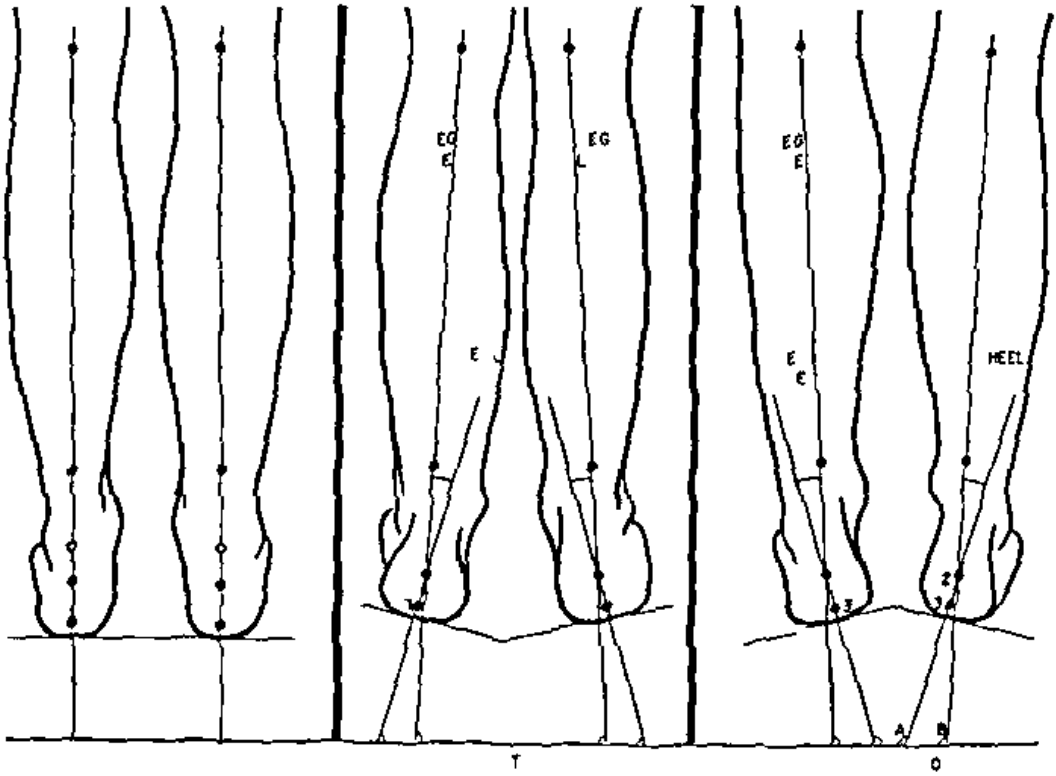
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F g re 1 Sk mark th l g and a gle C (1) Mid p pl t l po ts ( ) Mid talo al an al po ts (3) M d h l po ts (4) Upp Achill s p ts. l pronat on ∠C=∠B−∠A up at n ∠C=∠A−∠B

angle C was automatically measured and recorded by a new device called an electrogoniometer

THE FOOT IN STANDING

MATERIALS AND METHODS

The subjects were colle_e students with normal feet

Leg marking is illustrated in figure 2 The subject stood with feet parallel to each other The medial condyle of the tibia and the head of the fibula were found Using sliding calipers the mid popliteal point was found A T square was then placed horizontally at the lowest point of the medial maleolus and a mark was made on the middle of the tendon of Achilles the mid Achilles mark To assure the horizontality of the square a round spirit level was attached to this device (fig 2 I) A line extending to the base of the heel was drawn through these points Two more marks also were made the mid heel 1 inch above the ground and the talocalcaneal midway between the mid Achilles and the mid heel

An inclinator an apparatus for changing the degree of pronation or supination in a standing subject was used It consists of two platforms hinged together in the middle a jack under the hinge and a protractor By operating the jack the middle

may be lowered or raised, changing the angle formed by the platforms

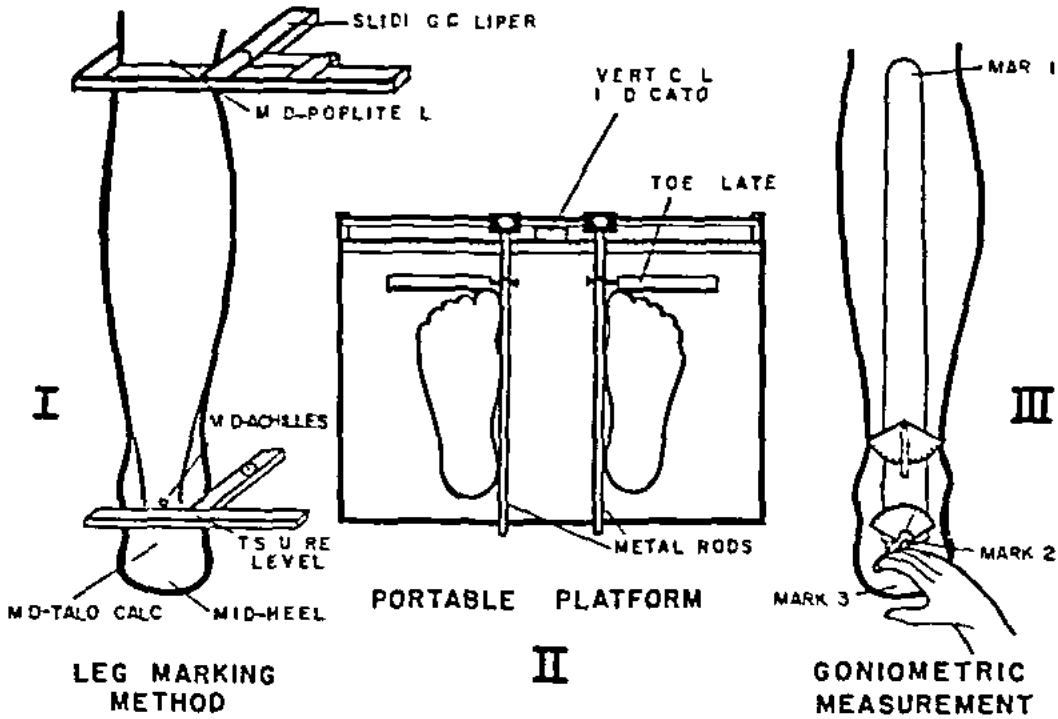


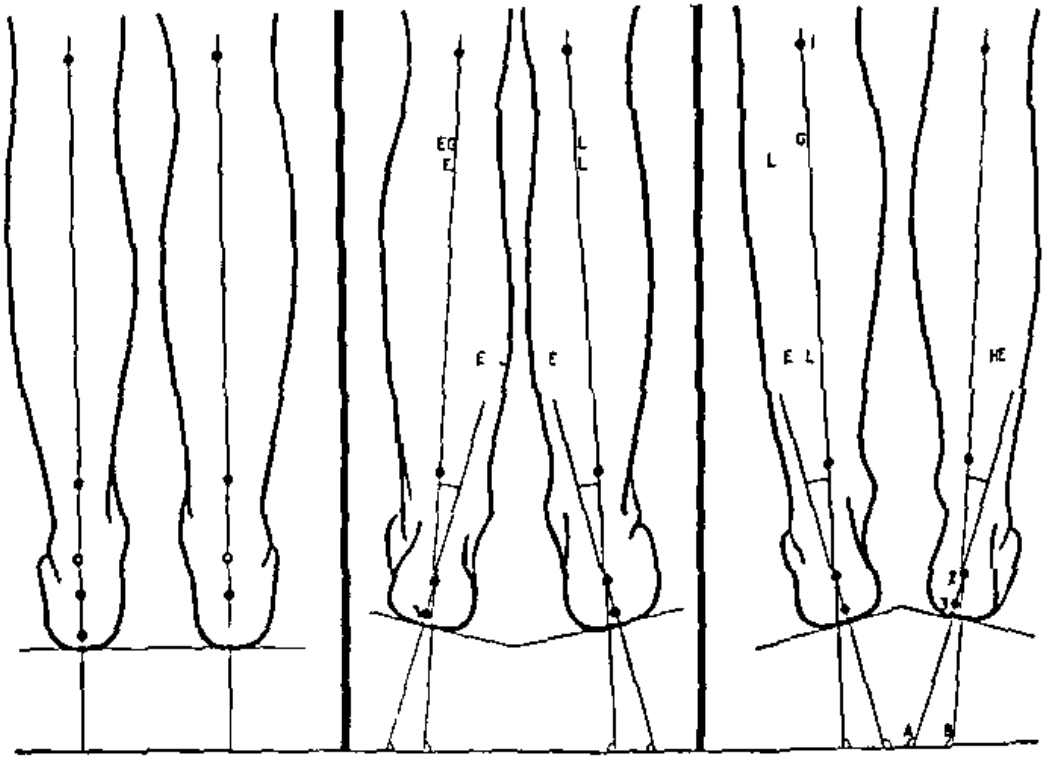
Figure 2 Leg mark ng method portable platform and manual gon ometer

The portable platform (fig 2 II) had two metal rods which could slide sideways and were used to keep the feet parallel and toe plates which could slide anteroposteriorly and serve as stops for the big toes A straight ruler was attached to the middle of the platform and served as an indicator of the vertical ity

As in a previous study [1] legs of the subject were appropri ate y marked and photographed The angle C was measured on these photographs

Footgear had been made with transparent plastic uppers so that the markings on the skin could be photographed Low quarter shoes and combat army boots with standard outsoles and also with Hack ripple outsoles were used One half of each type of footgear had conventional insoles and the other half had function al insoles A functional insole was made from a conventional one by placing inside the shoe a wedge like, plastic insert over the medial half of the heel There were, therefore altogether six subtypes of footgear loaned for this study by the Quartermaster Research and Engineering Center Natick, Mass

1 Low quarter conventional insole (LQc)
2 Low quarter functional insole (LQf)
3 Boots standard outsole conventional insole (Sc)



F g re 1 Sk mark tl l g and a gle C (1) Mid p pl te l p ts. (2) Mid t lo l an al p ts (3) M d b l p t (4) Upp A b ll p ts. l pronat on ∠C=∠B−∠A pi at ∠C=∠A−∠B

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that all tested footgear had a definite supinating effect The difference between means obtained with conventional and functional insoles (9°) was not statistically significant

TABLE 1 *The means of angle C for both feet of nine subjects standing on two separate planes inclined toward the middle line at 0° 5° 10° 15° and 20°*

Footgear	0°	5°	10°	15°	20°	Grand mean
Low quarter shoes conventional insoles (LQc)	4 9	4 1	-9 3	12 1	14 6	10.0
Low quarter shoes functional insoles (LQf)	6 2	5 2	-9 2	12 4	-14 9	-10 4
Boots standard outsole conventional insoles (Sc)	5 4	-3 9	-6 9	8.8	10 1	7 6
Boots standard outsole functional insoles (Sf)	6 3	-3 7	-6.0	-9 0	10 7	-7 4
Boots Hack outsole conventional insoles (Hc)	6 0	-3 9	7 2	-9 2	11 7	8 0
Boot Hack outsole functional insoles (Hf)	6.4	-4 2	-6 8	-9 5	11 7	-8 0
Barefoot	1 9	3.0	5.8	7 5	8 8	-6 3

Negative sign indicates pronation.

Three-way analysis of variance

Source of variation	Degrees of freedom	Sum of squares	Mean square	F
Subjects	8	345 75	43.27	13 1
Inclination	4	11389 46	2847 36	862.83
Footgear	6	304 64	50 74	15 38
Footgear × subjects	48	308 62	6 42	1 94
Subjects × inclination	32	795 95	24.87	7 50
Inclination × footgear	24	404 24	16 84	5 1
Error	192	63 26	3 3	
Total	314	14185 92		

Significant at the 1 per cent level.

Results of the Duncan multiple range test of means given in table 1

Type of footgear	Barefoot	LQc	LQf	Sc	Sf	Hc	Hf
Mean degree of angle C	-6 3	10 0	10.4	7	7.4	-8 0	8.0

Not Any two means not underscored by the same line are significantly different from each other at the 1 per cent level.

When the Duncan multiple range test was applied to the values of angle C obtained with the inclined planes it was found that while the difference in angle C between the different types of footgear was significant there was no difference in the effects of conventional and functional insoles for the same type of footgear

Effect of distance between the feet upon angle C barefoot Subjects stood on a horizontal plane with feet parallel to each other and 6 10 and 14 inches apart (fig 2) The purpose of this experiment was to determine the importance of the distance between the feet for diagnostic examination of the patient Twelve subjects were used A photographic method of measuring angle C was used

Table 2 clearly shows that the distance between the feet affected the angle C With feet 6 inches apart there was an average pronation of 2 3 With 10 inches between the feet the average angle C was 3 indicating a shift to supination and

TABLE 2 *Eff t f d tan b tw th f t d g f angl C 12 b foot bj t*

	D tan betw th f t		
	6 in h	10 ch	14 in he
M an for bje	2 3	3	1 5

N g gn indic t pr t n.

Two w y an ly f vari

Sour f ar tion	D g f f d m	Sum f quar	M an q ar	F
B tween bj	11	295 42	26 86	4 16
B w e d t n	5	186 52	37 30	5 78
Err	55	354 78	6 45	
T al	71	836 72		

S g f t h l per l l

only 5 out of 12 subjects exhibited pronation With 14 inches the angle increased to 1 5 The distance of 10 inches between the feet is therefore the best because in this position the directions of the legs and the heel lines have a tendency to coincide (angle C tends to become zero)

Effect of body weight distribution on angle C, barefoot Subjects stood on a horizontal plane with feet parallel and 6, 10 and 14 inches apart They were asked to stand in three different manners (1) with body weight evenly distributed over feet, (2) with weight shifted to the left foot, and (3) with weight shifted to the right foot The object of this experiment was to determine how much error might be introduced in the measurement of angle C if the subject's stance was not correct (body weight was not equally distributed on both feet)

TABLE 3 *Eff t f b dy we ght d tribut on on d g f gl C b f t bj t*

	F t 6 h p			F t 10 h p rt			F t 14 h part		
	BODY WEIGHT DISTRIBUTION								
	W L	Wt E	W R	W L	W E	W R	W L	Wt E	W R
	L R	L R	L R	L R	L R	L R	L R	L R	L R
M an	3 4 1	1 8 2 6	4 1 9	6 2 0	9 2	2 9 3 1	4 3 2	7 2 2	6 1 2
M $\frac{L\ R}{2}$	1 7	2 2	8	7	6	1	1 4	1 5	3 0

W L—body w gh huf d l f foo W E—w gh d b d ly bo h f W R—w gh huf ed ov gh foot
L—l f foo R— gh f $\frac{L+R}{2}$ — th g f angl C b d f m l f and gh f N gat gn di pro

F u y analy f an

S ur f ar at	D g f f d m	S m f quar	M qu	F
M ff				
D st	2	256 34	128 17	18 41
W ght	2	11 49	5 74	82
Subj	6	544 05	97 34	13 98
Foot	1	9 45	9 45	1 36
F t ord ct				
D st w gh	4	29 64	7 41	1 06
Di an ubj	12	89 91	7 49	1 08
Subj w gh	12	64 35	5 36	77
Subj foo	6	333 07	55 51	7 98
D foo	2	11 29	5 44	78
W gh foo	2	349 19	274 58	39 3
Comb ed d d third d un	76			
Err		5 8 80	6 96	

Sign f ca at h l per en l L

Analysis of variance (table 3) shows that there was a statistically significant effect of weight distribution upon angle C Shifting of weight over one foot caused an increase in pronation of that foot and increase in supination of the other foot

When body weight was unequally distributed, the difference between the angles C for the left and right foot was greater than

when the weight was equally distributed When however the average of angle C for both feet was calculated it was found that the uneven weight distribution had little effect if any on the average The differences were usually less than 9 This was especially true for 10 inch distance between the feet When weight was distributed evenly the average of angle C for both feet was 6 when weight was shifted to the left foot it became 7 and when it was shifted to the right it became – 1 the difference being only a small fraction of a degree

Comparison of measurements of angle C made with manual goniometer and with photographic method Subjects stood on either horizontal or inclined planes Angle C was measured on the same subjects with the manual goniometer and with the photographic method Altogether 138 double measurements were made on 17 subjects The difference between the means obtained with both methods of measurement was 2 and the coefficient of correlation 96 These findings proved that the manual goniometer is a reliable instrument and that it is justifiable now to dispense with the tedious photographic method

DISCUSSION

The supinating effect of the conventional and functional insoles As in a previous investigation the additional supinating effect produced by the functional insole was not statistically significant Again the question may be raised Why should *every body* have a supinating device incorporated into footgear construction? There are a great many people who increase the supinating effect of their footgear just by ordinary walking and by wearing off the outer side of the heel thus making the medial side of the heel relatively higher

Attention is called to the fact that the barefoot subjects in this group had a slight supination instead of pronation This is just a matter of chance Supination also was observed in some persons in the previous study

Effect of distance between the feet and weight distribution The distance of 10 inches between the parallel feet is the preferred distance because in normal legs the leg line and the heel line form an angle equal to zero Body weight distribution will not affect the average value of angle C calculated for both feet This can be done by placing a stand with a vertical rod in front of the subject midway between the feet If the contours formed by the rod and each leg are identical weight distribution should be equal

The introduction of the manual goniometer made the measurement of angle C much easier than with the use of a photographic method In using this goniometer the marking system described

in this part of the article should be followed otherwise, the results obtained will be either questionable or just wrong

THE FOOT IN WALKING

At the beginning of the study of the foot in walking an attempt was made to measure angle C by the photographic method used in studying the foot in standing Soon it became evident that this method would require taking a large number of photographs simultaneously from two directions and would demand an enor mous amount of time for reducing photographic data to under standable terms Almost in desperation, an electrogoniometer was invented This instrument can be attached to the subject's foot, and angle C can be recorded automatically on an oscillo graph The new instrument was used exclusively in this part of the study the foot in walking

MATERIALS AND METHODS

An electrogoniometer (fig 4) is an instrument for automatic recording and measuring of degrees of movement in a joint

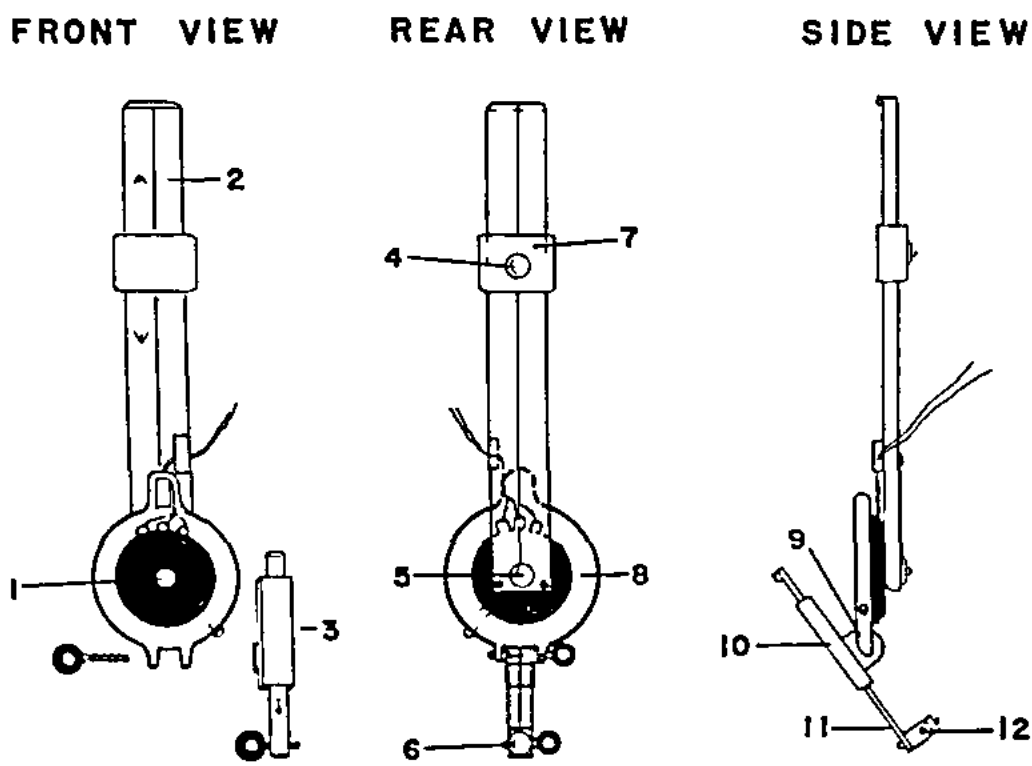


Fig re 4 Elect ogoniometer fo angle C (1) Rheostat (2) Long shaft 5'2 inches (3) Short haft. (4 5 and 6) Stud s ap fa teners (7) Short sleeve (8) F ame (9) Hi ge (10) Long sl eve (11) Sliding ba I 3/4 nches. (12) H ge

Essentially it is a goniometer in which a rheostat has been substituted for the protractor Electric current supplied by a small battery is sent through this rheostat to an oscillograph

where changes in voltage are recorded and read off in degrees The electrogoniometer for the talocalcaneal joint used in this study was developed designed and built by P V Karpovich and G P Karpovich Since completion of this study a universal goniometer which can be used on other joints has been developed

To measure angle C with the electrogoniometer the center of the rheostat (1) is placed on the mid talocalcaneal point the long shaft (2) is placed on the leg and the short shaft (3) on the heel The electrogoniometer is secured to the leg by means of snap fasteners The sockets of the fasteners are attached to the middle of small plastic saddles " These saddles are taped to the leg and foot and the studs of the snap fasteners are attached to the electrogoniometer and then pressed into the sockets of the saddles

The long shaft slides in a sleeve (7) to allow for dorsiplantar movements of the foot and is attached to the housing of the rheostat The short shaft essentially consists of a sleeve (10) through which passes a sliding bar (11) with a hinged stud of the fastener (12) at the lower end The sleeve (10) is hinged to the frame (9) which in its turn is secured firmly to the knob of the rheostat The sleeve of the short shaft and the hinges (9 and 12) allow adaptation of the goniometer to any shape of the heel and eliminate the interference of the dorsiflexion

The rheostat used for the construction of the goniometer has 0 to 10 000 ohms of resistance is 1/4 of an inch thick and 5/8 of an inch in diameter

The plastic saddles used in this investigation ranged from 1½ inches to 2¹ inches in length and from ½ inch to ¾ inch in width Their thickness was 1/16 inch Each saddle had a slightly different contour to best fit the contour of the leg and foot at different points They were secured to the skin by 1 inch wide adhesive tape To aid in accurate placing of the saddle a piece of stiff wire was passed through the fastener of the saddle The end of the wire was placed on the desired mark on the leg and the saddle was then moved toward the leg taped to the skin and then the wire was removed

For calibration of the goniometer a special 40 protractor was made the mid point of which was designated 0 and the two halves of which were marked off from 1 to 90 The center of the protractor had a socket snap in which the stud snap of the rheostat could be inserted The long shaft of the goniometer was immobilized by another socket snap located directly above the center A plastic extension with a hairline drawn in the middle was attached to the short shaft to aid in calibration

For the sake of lightness and convenience in handling, it was desirable to make this instrument shorter and smaller than the manual goniometer used in the first part of this study The change in the length of the shaft necessitated determination of a new mark on the leg to which the upper saddle and, therefore, the upper sleeve of the goniometer could be attached This place should be close to the talocalcaneal joint and should remain on the "leg line" during changes of angle C

For this purpose, an experiment was conducted on seven subjects The leg lines were drawn on the skin of both legs, according to the directions given in the study of the foot in standing The legs were then photographed in three positions (1) normal, (2) maximum supination, and (3) maximum pronation

Examination of photographs showed that during supination and pronation the leg line became distorted, forming either a C or S curve (fig 5) The S curve intersected the true leg line at an average distance of 4 6 inches from the talocalcaneal point

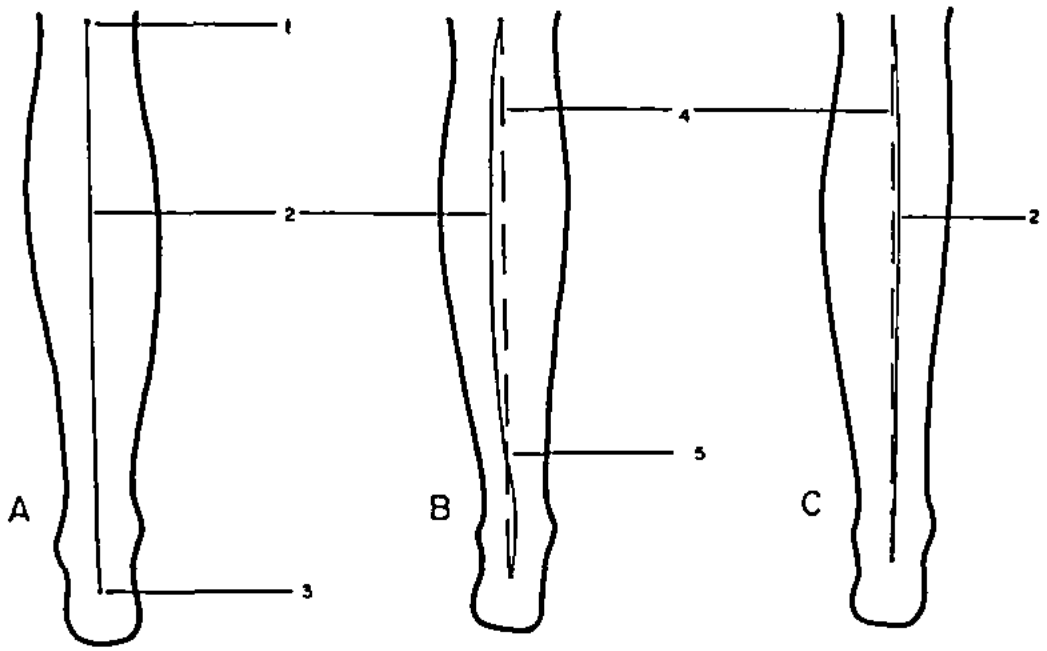


Figure 5 Distortion of the leg l e d to kin a d m scle movement during sup nat on of right foot (A) No mal stand ng (B) S curve distoration (C) "C curve d to tion (1) Ma k 1 (2) L d aun on sk n (3) Mark 2 (4) True leg l ne (5) Inter ection of line draun on kin and t ue leg l ne

Since the distortion of the leg line which assumed the shape of the letter C did not intersect the true leg line it was important to find out what error would be made in measurement of the angle C if the upper sleeve of the goniometer were attached also 4 6 inches above the talocalcaneal center

Measurements made on 18 subjects showed that the average error would be 63° and the range of error 0 1 5° For this reason,

it was decided to accept the point 4 6 inches above the talocalcaneal joint as the point of location of the stud anchoring the stud of the sleeve for the long shaft For expendiency 4 5 inches instead of 4 6 was used

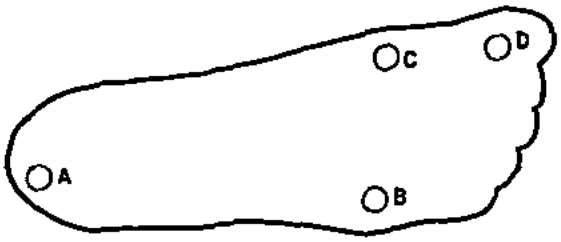
Inasmuch as the central stud of the rheostat is held by the socket part of the snap it is possible to assume that if the position of the socket were not always related to the movement in the talocalcaneal joint this would make the position of the center of the rheostat unrelated to movement and would cause an error in measurements In order to investigate this situation a sandwich made of two pieces of white paper and a piece of carbon paper in between was placed over the socket so that the stud of the rheostat could move freely on the paper Subjects were made to pronate and supinate their feet to the maximum and also to walk At the end of each test the position of the socket was marked on the paper by a gentle pressure against the snap socket It was found that the central stud remained remarkably close to the position of the socket The average of the occasional deviations was 1 mm and mostly downward Such a displacement reflected little if at all on the measurement of angle C Thus during subsequent experiments the electrogoniometer was attached to the points 4 2 and 3 (fig 1)

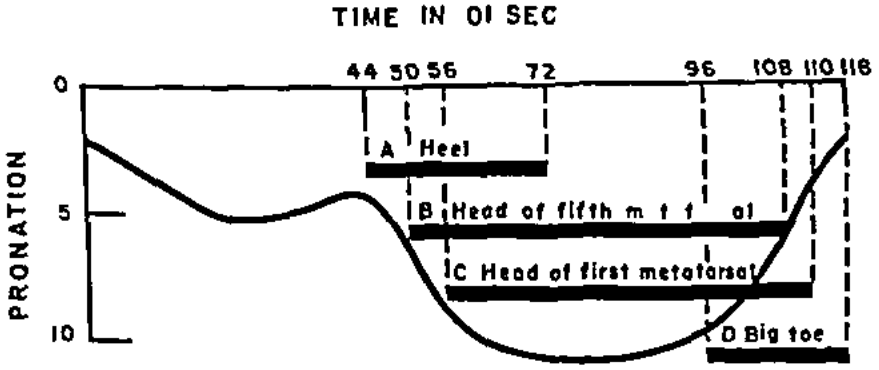
Contact indicators Flat electric switches were used to indicate the beginning and the end of contact of various parts of the sole with the ground They were made of two small pieces of cigarette pack foil separated by a piece of perforated adhesive tape Wires were attached to each piece of foil and the entire switch was covered on the outside by two 1 inch in diameter adhesive tape disks Even a slight pressure was sufficient to cause a contact between the two pieces of foil These switches were connected with the oscillograph for simultaneous recording of the changes in angle C Walking was done on an electrically driven treadmill and also on the floor

Simultaneous recording of the foot and leg position and angle C Subjects had electrogoniometers attached to both legs and four flat switches (contact indicators) placed on the sole of each foot (1) under the heel half an inch from mid line to the lateral side and on the most posterior point of the contact with the ground (2) under the lateral protuberance of the head of the first metatarsal (3) under the head of the fifth metatarsal and (4) under the first phalanx of the big toe just next to the joint Both the electrogoniometers were connected with the oscillograph Because the oscillograph had four channels only two of the contact indicators could be added simultaneously

Simultaneously with records from the electrogoniometers and contact indicators photographs of the leg and foot were taken

from the lateral view Each time a photograph was taken, a mark was automatically made on the oscillograph This method made it possible to establish the relationship between leg positions and duration of foot contacts with the ground (fig 6)





F gu e 6. Angle C curve d ng walking and the sequence of ground contacts of fou points on the sole of the foot

Measuring degrees of angle C on the oscillogram In order to facilitate analysis of the angle C curve, six points were selected on the curve as landmarks

1 Big toe leaves the ground
2 Mid point of the air phase
3 Heel touches the ground
4 Toe of the other foot leaves the ground
5 Mid point of the ground phase
6 Heel of the other foot touches the ground

This selection was made after studying a number of oscillograms and foot photographs taken simultaneously At first a *direct* method of measuring angle C was used In this method every value of angle C at each of the six landmarks was measured and then averaged This method is extremely time consuming and therefore another method called the ruler method," was used The ruler method is similar to that used in measuring oxygen consumption from records obtained in basal metabolism tests In order to find oxygen consumption, a ruler is used to draw a line connecting the tips of expirations records This line automatically gives the average rate of consumption for the entire test. In measuring angle C, the ruler was used to connect the

TABLE 4 *C mpar be d and rul r me re m f angl C*

DIRECT MEASUREMENTS

M P H	Type f alk g	Landma k l ft foo 1	2	3	4	5	6	Landma k gh foo 1	2	3	4	5	6
2 39	Natural	4	2 5	1	5 5	-6 7	-6 7	1 4	1 5	0	3 8	-6 1	-4 7
	Toe g-out	2 4	3 9	1	5 6	-6 1	-6 7	2 3	3 2		-4 1	-4 6	3 9
	Par ll l	3	2 3	3	-4 8	-4 7	-4	8	1 5	6	4 0	5 0	3 9
	Toe g	8 2	1 3	2 9	6	2 3	1 6	1 1 0	1 8	1 3	2 5	3 3	2 7
2 84	Natural		2 6	1 1	-6 1	-6 5	-6 7	5 4	7	1 2	3 4	3 9	1 9
	Natur l	2	2 9	0	5 4	5 4	-6 1	1 7	2	3	4 9	5 0	4 0
	Long st p	1 5	2 4	1 0	5 1	5 1	5 6	7	9	2 5	-4 1	3 9	3 2
	Short step	7	1	1 1	3	-4 8	3 4	5	2 0	7	3 6	5 8	3 4
3 52	N tural	2 6	2 2	2 1	3	-4 9	3 9	4 9	1 6	1 8	3 4	3 4	1 3

ga nd pros on.

RULER MEASURE ENTS

M P H	Type of walk g	Landma ks l f foo 1	2	3	4	5	6	L ndmark ght foot 1	2	3	4	5	6
2 39	Natural	0	2	0	5		5	1	1	1	-6	7	5
	Toe -ou	2	-4	0	-6	7	4	2	3	0	5	5	-4
	Parall l	1	3	0	5	-6	2	1		0	-4	5	-4
	Toe	10	4	2	0	3		10	2	2	-4	5	2
2 84	N tural	1	2	1	-6		5	4	1	1	4	-4	0
	Natural	0	3	0	-4	5	-4	2	1		5	-4	0
	Lo st p	1			4		3	1	1	3	-4	5	-4
	Short p	1	2		5	-6	-4	1	2	0	-4	-6	-4
3 52	atur l	1	3	1	4	5	-4	4	2	2	4	-6	5

on groun

D ff b twee an

Me ur ment method	Deg ee of freedom	Mean	D ff	S E D	T-r
ct	108	2 4			
*Rul	108	2 18	36	447	304

The *diff* re ot stat st lly f

identical parts in each step It is very easy to recognize points 1 2 3 and 5 Points 4 and 6 are nothing but points 1 and 3 for the *other* foot and can be found when oscillograms of both feet are obtained simultaneously Before the ruler method was adapted it was compared with the direct method (table 4) The mean difference was not statistically significant

RESULTS

From data obtained on six normal subjects who walked bare foot on the treadmill and on the floor typical curves were prepared (figs 7 and 8) They show that the angle C during each step forms a curve which consists of two semicircular dips One shallow corresponding to the air phase during which the foot is carried through the air and the other a deep one corresponding to the ground phase during which the foot is in contact with the ground The air phase in this figure occupies

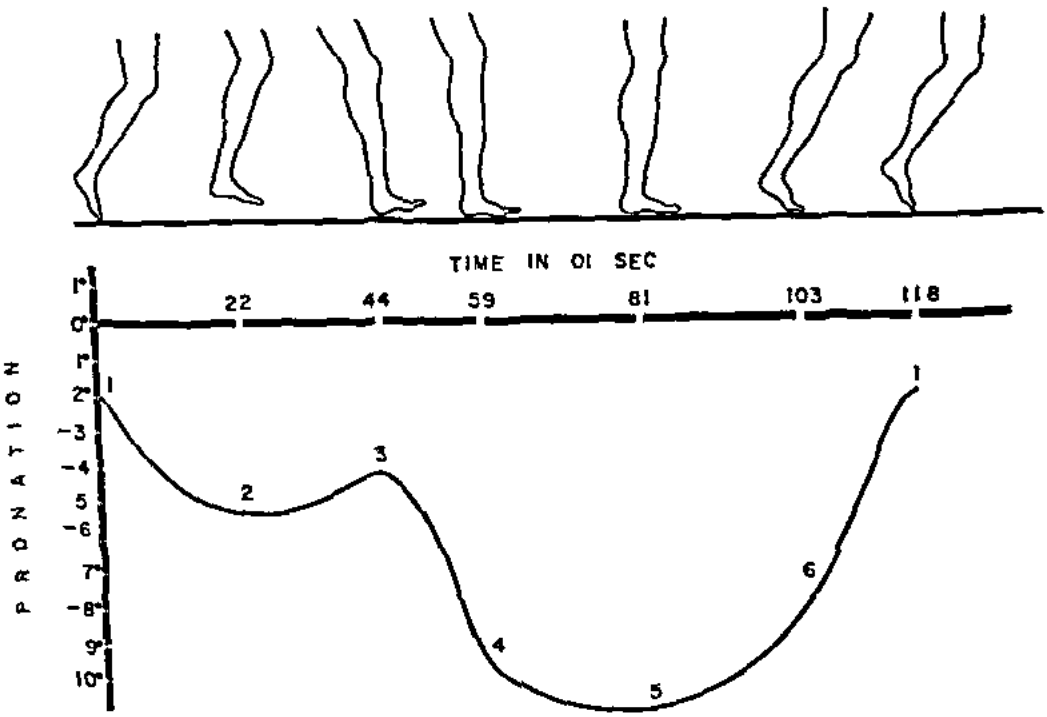


Figure 7 Relation between the position of the leg and foot and the angle C curve (Medial view of the left leg shown) (1) Big toe leaves the ground (2) Mid point of the air phase (3) Heel touches the ground. (4) Big toe of the other foot leaves the ground. (5) Mid point of the ground phase (6) Heel of the other foot touches the ground.

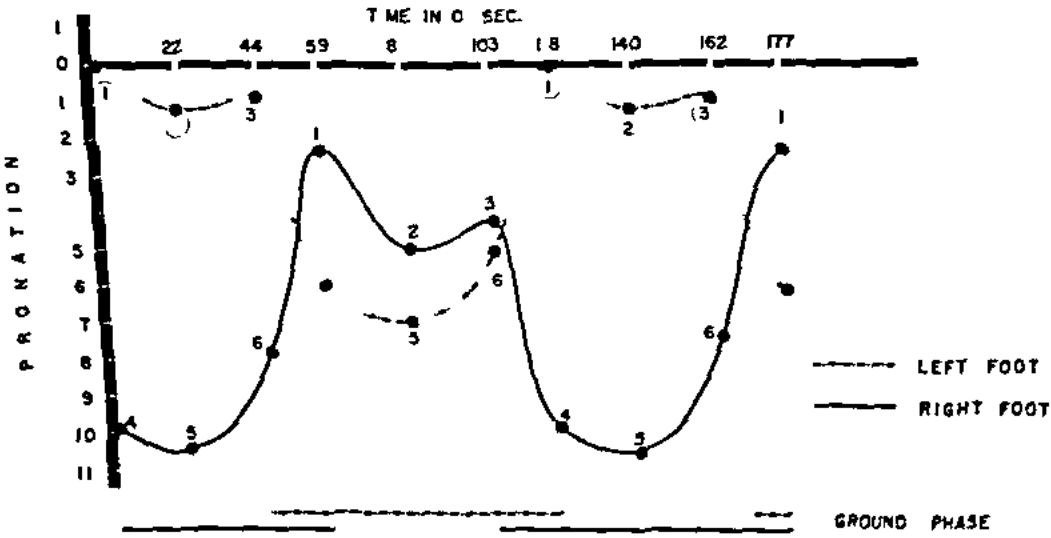


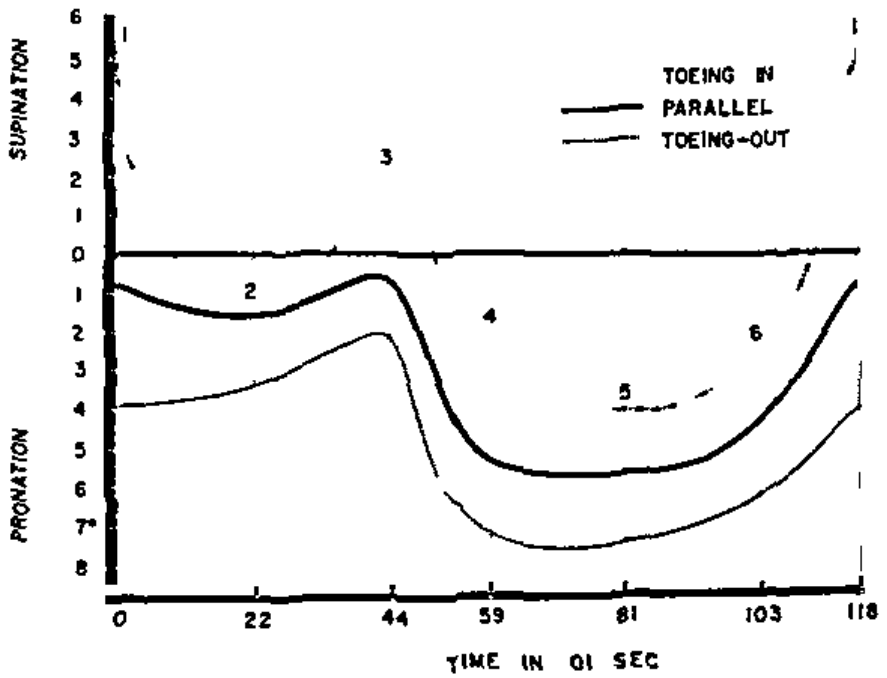
Figure 8 Angle C curves of right and left foot during horizontal barefoot natural walking (1) Big toe leaves the ground. (2) Mid-point of the air phase (3) Heel touches the ground. (4) Big toe of other foot leaves the ground. (5) Mid point of the ground phase (6) Heel of the other foot touches the ground.

0 44 sec and the ground phase 0 74 sec The angle C is in pronation most of the time especially during the ground phase This can easily be understood because at that time the foot becomes weight bearing or emphasized and this has previously been shown to increase pronation

The ground phase begins (fig 6) with the heel touching the ground 0 05 sec later the head of the fifth metatarsal and 0 47 sec later the big toe contacts the ground Thus the duration of the ground contacts of these four parts are (1) heel 0 28 sec (2) head of the fifth metatarsal bone 0 58 sec (3) head of the first metatarsal bone 0 54 sec and (4) big toe 0 22 sec

Table 5 and figure 8 show that the variations in the angle C for the right foot were greater than for the left foot It may also be observed that the amount of pronation was greater in the right foot than in the left throughout the step

Effect of speed and the length of step on angle C is shown in table 4 Apparently angle C was the same for speeds of 2 39 m p h and 3 59 m p h The increase in length of step however increased the amount of pronation during the ground phase



F g 9 A gl C ur bt d on th l ft f t t g pa ll l d t g ut walk g (1) B g to l a th g nd. (2) M d po t of the a pha e (3) H l t h th g und. (4) B g t f the th foot l th g nd (5) M d p i t f th gro d phas (6) H l f th ther f t t be th g nd

From table 5 and figure 9 it may be seen that compared to angle C durin$_o$ parallel walking toeing out increases pronation

TABLE 5 *Average degrees of angle C at six landmarks on the angle C curve for various types of walking (six subjects)*

M P H	Type of walking	LEFT FOOT Landmark number 1	2	3	4	5	6	RIGHT FOOT Landmark number 1	2	3	4	5	6
2 39	Natural	5°	2 2°	1 2°	6 7°	7 8°	5 7°	2 5°	5 0°	4 0°	9 7°	10 7°	8 8°
	Toeing out	4 0	3 5	2 0	7 3	7 2	6 2	7 0	6 8	5 3	10 8	11 0	9 5
	Parallel	7 7	1 7	3	5 5	5 7	3 8	2 8	4 8	3 8	7 8	9 3	6 7
	Toeing in	5 3	1 7	2 3	1 8	4 2	1 8	4 8	2 8	2 5	7 3	1 3	5 2
2 84	Natural	5	1 7	5	6 0	6 5	5 2	1 8	5 5	4 3	10 0	10 5	8 0
	Natural	2	2 5	1 0	6 2	6 7	5 3	2 3	4 5	4 0	10 5	10 8	7 3
	Long steps	0	2 0	7	6 3	8 3	6 2	2 3	4 5	4 0	10 3	11 2	9 7
	Short steps	5	2 0	8	6 2	6 5	4 5	3 3	5 7	4 3	9 3	10 5	6 7
3 52	Natural	3	2 3	8	6 8	7 5	5 7	1 7	4 8	3 5	9 7	10 8	7 3
Grand average for 11 natural walking		0	1 4	9	6 1	7 1	5 5	2 1	5 3	4 2	10 0	10 7	7 9

ng on the ground Negative ign indic tes pronation

and toeing in decreases it. Toeing in walking caused the greatest change in angle C, the range being from +5.3 to −5.2.

From table 5 one may see that angle C obtained during walking on a treadmill and on the ground were the same.

DISCUSSION

Although the measurement of angle C on oscillograms can be easily made with special scanning machines, these machines are expensive and not always available. The "ruler" method represents a simple, practical and reliable method.

It was found that during natural walking the amplitude of angle C and the amount of pronation of the right foot were greater than for the left foot. This occurs because in walking the right foot toes out more than the left foot. It was shown in this study that toeing-out increases pronation.

There has been a great deal of debate regarding the correct position of the feet in walking. Some writers have advocated toeing in and others the parallel position. One of the factors frequently contributing to foot discomfort is excessive pronation. If this be true, then reduction in the amount of pronation would be beneficial. Toeing out therefore should be avoided.

Exaggerated toeing in, as used in this study, is however uncomfortable and subjects tend to lose their balance. This type of walking therefore cannot be recommended.

SUMMARY AND CONCLUSIONS

A study of pronation and supination of the human foot (1) in standing and (2) in walking was carried out.

1. *The foot in standing.* The supinating effect of footgear with conventional and functional insoles was compared in subjects standing on a horizontal plane. With conventional insoles there was 5.4° of supination, whereas the functional insoles produced 6.3°. The difference, however, was not statistically significant. In subjects standing on inclined planes adjusted at 5°, 10°, 15° and 20° of pronation, the functional insoles caused no statistically significant supinating effect. The need of an increase in supination for everybody was questioned.

For a diagnostic examination, a distance of 10 inches between parallel feet is preferred because the angle C at that position tends to be zero; therefore deviations may be more easily observed. During an examination the body weight should be evenly distributed because shifting weight to one foot increases pronation in that foot. The manual goniometer for measuring angle C was described. This instrument should supplant the time con-

suming photographic method. The accuracy of this instrument is high. The difference between the means obtained with photographic and goniometric methods was 0.2° and the coefficient of correlation 0.99.

2. *The foot strikometer.* An electrogoniometer was developed as an aid in studying the foot in walking. This instrument can be used for automatic recording or quick direct measuring of angle C.

A typical angle C curve consists of two arcuate dips. One is shallow, corresponding to the air phase during which the foot travels through the air, and the other a deep one, corresponding to the ground phase. In most people angle C is in pronation. The right foot is more pronated than the left foot. Toeing out increases and toeing in decreases pronation. Angle C was the same for speeds of 2.39 m.p.h. and 3.52 m.p.h. Increase in length of step increased pronation. Angle C was the same when subjects walked on treadmill and on the floor.

Electrogoniometers for other joints are being developed. The development of the electrogoniometer has opened a new avenue for study of normal and abnormal joints in motion.

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REFERENCES

1. Karpovich, P. V., Kenney, C. E., and Alexander, A. A., Physiological and Kinesiological Methods for Testing Footgear, Annual Report No. 1, Fourth Quartermaster Research and Development Center, Contract DA 19-129-QM-309, Physiology Department, Springfield College, Apr. 16, 1957. Also issued Report No. 13, Footwear and Leather Section, Quartermaster Research and Engineering Center, Textile Clothing and Footwear Division, Natick, Mass., Jan., 1959.

2. Karpovich, P. V., and Karpovich, G. P., Electrogoniometer: a new device for study of joint action (abstract), *Fed. Proc.* 18, Part I, 79, Mar., 1959.

3. Morton, D. J., A glance at a study based upon examination of feet of Chinese, *J. Bone & Joint Surg.* 14, 741-754, Oct., 1932.

4. Dicks, F. D., and Dicks, R. L., *Functional Disorders of the Foot: Diagnosis and Treatment*, 3d ed., rev., J. B. Lippincott Company, Philadelphia, 1955, p. 33.

5. Hiss, J. M., *New Feet for Old*, Doubleday, Doran & Company, Inc., Garden City, N. Y., 1933, p. 61.

6. Standish, A., *Kinesiology of the Human Body Under Normal and Pathological Conditions*, Charles C. Thomas, Publisher, Springfield, Ill., 1955, p. 387.

7. Schwartz, R. P., and Heath, A. L., Some factors which affect the balance of feet in walking, stance phase of gait, *J. Bone & Joint Surg.* 19, 431-442, Apr., 1937.

If a man can have only one kind of sense let him have common sense. If he has that and uncommon sense too he is not far from genius.—H. W. Beecher

NEW TRACTION DEVICE FOR TRANSPOR TATION OF PATIENTS WITH FRACTURE DISLOCATION OF CERVICAL SPINE

WILLIAM I SILVERNAIL *C pt* *USAF (MC)*
JOSEPH M COLLINS *L ut ant C l* *l USAF (MSC)*

THE patient with a fresh fracture dislocation of the cervical spine is in a dire position Only good management can avert the catastrophe of temporary or permanent quadri plegia in a patient not previously paralyzed Good management of the patient with a definite or suspected fracture dislocation of the cervical spine must begin with the emergency situation Aggravation of an already dangerous situation must be prevented and nothing done to increase the bony deformity This is ac complished by maintaining traction in the spinal axis while transferring the patient to a litter and while transporting the patient on the litter to the hospital

For many patients further transportation to a neurosurgical center will be necessary Here too the same care and diligence is required A recent survey of 2 500 cases delivered by ambu lance to the hospitals of a large city revealed that a number of cases could have been killed or reduced to permanent invalidism by a rough ambulance ride Because of the extreme incapaci tation associated with traumatic injuries to the cervical spine aggravation of this sort must be avoided at all costs

The devices available for immobilization of neck fractures were strong willing hands blankets sandbags or the tying of a halter to a cross bar on a litter with the free swinging weights associated with the traction setup attached to the litter or over a chair placed on its side [1] or to a Stryker frame Wi of these it was impossible to maintain steady continuou of a predetermined amount. This leaves it pretty muc chance whether or not the patient s difficulty will be inte in transfer to nearby medical facilities

The military physician has an additional problem in regard to transportation of these patients in traction His neurosurgical

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treatment referral center may be at a great distance that requires air evacuation flights up to 30 hours for further hospitalization, treatment and rehabilitation One of us (J M C), as a member of such an air evacuation team, observed that patients in weight traction experience considerable pain and discomfort when flying through turbulent air or riding in ambulances Tests, conducted using a 10 pound weight suspended from a simulated patient with pulleys a steel wire cable, and a tensiometer, revealed that patients in weight traction in aircraft or ambulances receive rapid and frequent jolts of two and one half times the amount of traction prescribed Specifically, in these tests the tensiometer revealed moments of weightlessness followed by weight loads up to 25 pounds A traction unit was designed* that would facilitate the air and surface transfer of such patients and provide level steady, dependable traction during the transfer period

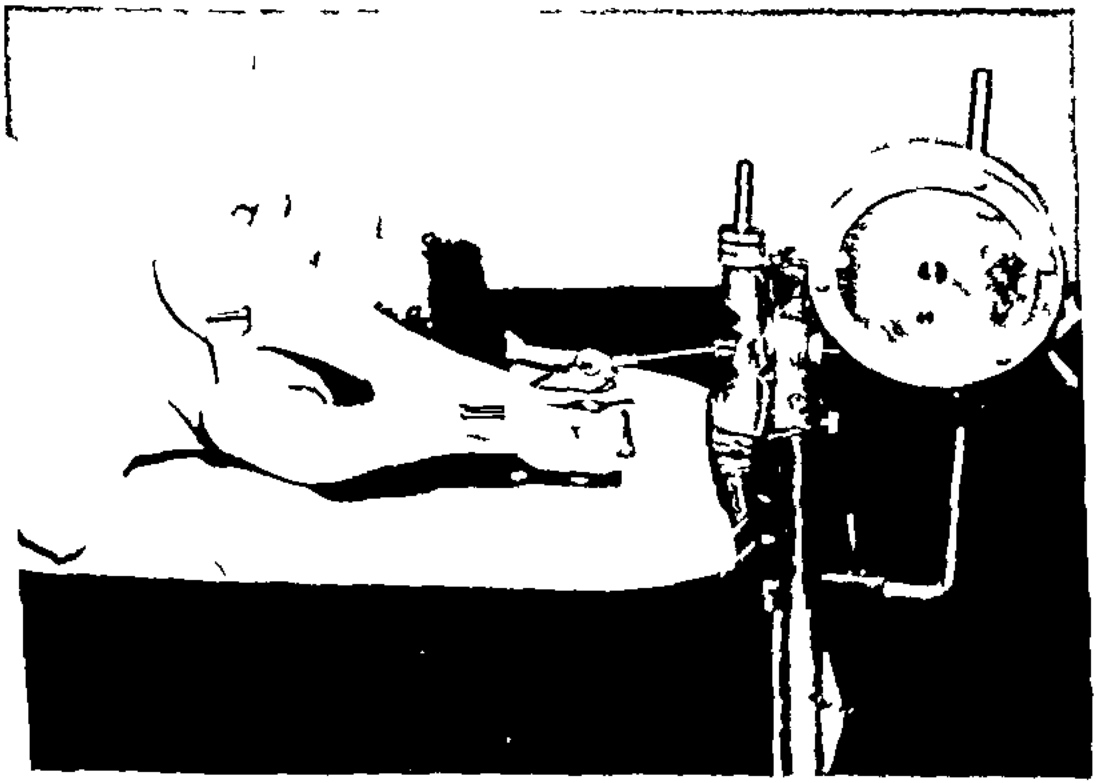
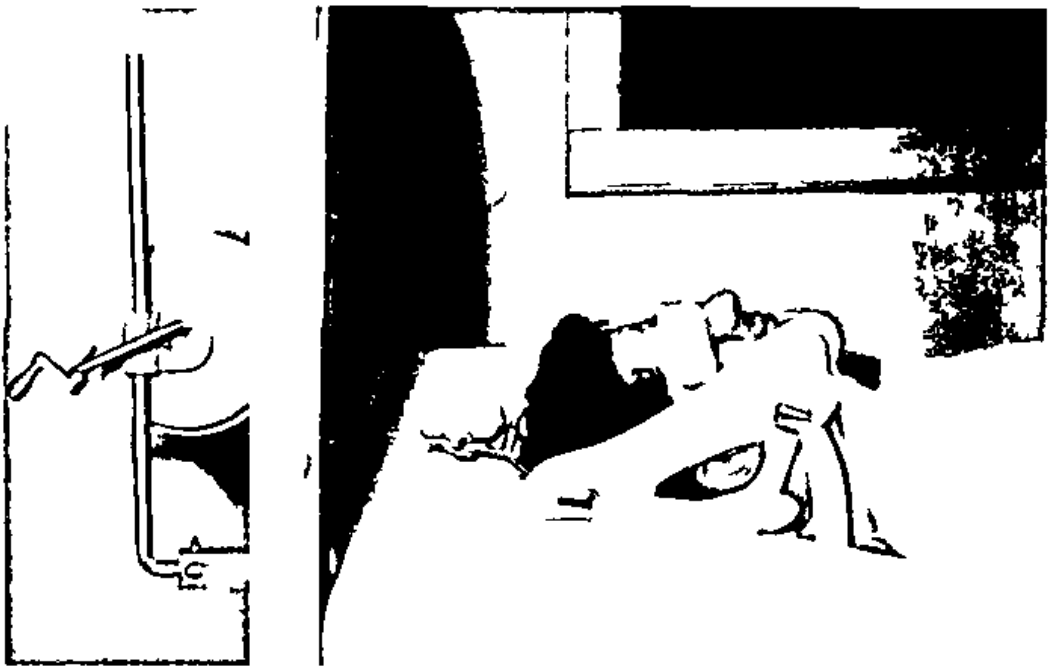


Figure 1 The traction device in use on a Stryker frame showing dial for direct reading in pounds of traction

This traction unit consists primarily of a drum onto which a wire cable is wound with the distal end of the wire cable attached either to a cervical halter or to Crutchfield tongs A crank rotates the drum to permit increasing or decreasing tension and a dial gives direct readings in pounds of traction (fig 1) Inside the drum there is a spring type arrangement to permit extension of the cable for movement of the patient up or down and

* Patent applied for

one half inches while the amount of traction changes only one pound Therefore for changes of traction of plus or minus one pound a distance of five inches of patient movement is possible Testing situations show that this is unlikely to occur under even the most turbulent conditions Other equipment for the traction unit consists of a variety of clamps to permit its attachment to the handles of a litter to a Stryker frame or to a hospital bed (fig 2)



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The traction device was tested many times on healthy persons in a variety of situations such as in aircraft in turbulent weather and produced steady unvarying traction Although it was originally designed for air evacuation purposes it was also tested in ground transportation situations where it functioned very well Subsequent to these tests the apparatus has been used on four patients each of whom had cervical spine injuries and two of whom were quadriplegic and all but one had Crutchfield tongs in place

TESTS WITH FRACTURE CASES

The first patient had a compression fracture of the sixth cervical vertebra and an extreme degree of cervical paraspinal muscle spasm with torticollis The traction apparatus was applied to the head of his hospital bed and used by this patient very comfortably for about two days in lieu of pulley and weights Repeated checking failed to reveal over one pound of deviation in his cervical traction throughout all the turning and manipulations necessary in his care Two other patients had fracture dislocations of the cervical spine with quadriplegia and the apparatus was attached to their Stryker frames The traction

device was also used to bring a patient from Korea to this hospital on a frame The evacuation was carried out in turbulent weather and delivered uniform traction to the patient without relaying the turbulence and changes of pressure to his neck The third patient was air evacuated from this hospital to Hickam Air Force Base on a Stryker frame in the new apparatus The patient was then removed from this type traction and placed in the old type of pulley set-up The patient observed that he was very comfortable and obtained uniform traction in the new device and found it most uncomfortable to return to the old type The fourth patient was removed from a homemade pulley traction set up at this hospital and put in the Collins traction device for helicopter transfer to the U S Naval Hospital, Yokosuka, Japan, for definitive treatment by a naval neurosurgeon A steady ten pounds of traction was comfortably and easily maintained throughout this second stage transfer

While this traction device has had a very limited number of trials, it is thought that the idea of this method of traction is sound and that the mechanism does provide the stable uniform traction predicted for it The unit was easy to set up and to handle and was quickly adapted to a bed a Stryker frame, or a stretcher The ground transportation of these patients was facilitated by the use of this apparatus It is predicted that the apparatus will work equally well in emergency situations where only a neck halter is available such as at an outlying hospital dispensary or where an ambulance has been called to the site of an accident Perhaps the greatest value of this device will be in the emergency transfer of patients from the scene of an accident to a dispensary or hospital and in the second stage transfer to a neurosurgical center for definitive care This unit is also adaptable to other fractures in which traction is desired Its usefulness will be limited only by the ingenuity of those who possess the device

SUMMARY

The hazardous situation of the patient with a fracture dislocation of the cervical spine especially while being transported is noted A new universally adaptable apparatus is described that will provide uniform dependable traction during patient transfer and that will reduce the risk of aggravating the deformity

REFERENCES

1 Scarff J E Injuries of the brain and spinal cord In Brock S (editor) *Injuries of the Brain and Spinal Cord and Their Coverings* 3d edition Williams & Wilkins Company Baltimore Md 1949 pp 539-540

2 Lyttle S N Management of cervical injuries and the Hillrayer lo *J Michigan St Soc* 57 1112 1115 Aug 1958

3 Kahn E D Brett R Schneider R and Crosby E *Correlative Neurosurgical Thomas Springfield Ill* 1955 pp 3 8 379

PATHOLOGIC IMPLICATION OF THE CATECHOL AMINES EPINEPHRINE AND NOREPINEPHRINE

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ROBERT M DIMMETTE *Command MC USN*
ELGIN C. COWART *J C mm d MC, USN*

CONTROVERSY exists in regard to the therapeutic use of sympathoadrenal pressor amines in hypotensive states and clinical shock Their effectiveness in hemorrhagic and cardiogenic shock in regard to survival is the subject of numerous articles employing statistical experimental and clinical methods [1-4]

Very little attention has been paid to the tissue changes produced by therapeutic amounts of epinephrine and norepinephrine although the potent necrotizing property of these amines is well known to the clinician in the form of skin sloughs A previous report from this school attributed clinically unrecognized myocarditis to prolonged infusion of norepinephrine (NE) At this institution similar changes were experimentally produced in dogs Morphologic changes in the kidney and liver with NE therapy have been reported from human autopsy material

Epinephrine inhalation therapy reportedly produced necrotizing changes in the respiratory mucosa Instances of fatal poisoning by parenteral injection of epinephrine were reported by Cornsen and others The autopsy material in epinephrine poisoning cases showed pulmonary edema venous and capillary congestion of viscera and acute renal hemorrhages Similar findings have been frequently reported in victims of pheochromocytoma of all ages In pheochromocytoma foci of myocardial necrosis in different stages of healing hypertrophy and widespread arteriosclerosis are commonly present. These cases of pheochromocytoma can be utilized to show practically all the known lesion produced by catechol amines Chronic intermittent parenteral injections of catechol amines in experimental animals led to intimal proliferation and arteriopathy with medial necrosis

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The recognition and evaluation of the structural changes and their impairment of function may serve to further the understand ing of the pharmacodynamics of catechol amine therapy

MATERIALS AND METHODS

A complete review of the earlier literature would be too lengthy for presentation, but selected articles with aspects regarding morphology and pathogenesis of the lesions produced by catechol amines have been incorporated

We selected illustrative cases from human autopsy and surgical material of patients treated with catechol amines or affected with pheochromocytoma We also used illustrations of experi mental lesions produced in dogs by NE infusions Details of those experiments from this institution are reported elsewhere [5 14] With these illustrations we hope to emphasize the pathologic changes that might be observed by the general pathologist in clinical practice

The multiplicity of morphologic changes produced by catechol amines is directly related to the dosage rate and the route of administration

SKIN AND MUCOUS MEMBRANE LESIONS

Subcutaneous infusion of serum enriched with 5 to 10 per cent dextrose in the treatment of shock was considered effective in the 1920 s Efforts to increase blood pressure led to adding epinephrine to such hypodermoclysis The result was disastrous The favorite sites of administration being beneath the breast or the abdominal wall necrotic sloughs of the anterior chest and abdominal walls resulted [5]

Ischemic necrosis complicating norepinephrine therapy has been a frequent occurrence in clinical practice since 1951 [16 17] Sloughs might result not only in the areas of accidental extra vasation of the intravenous fluids containing the amine, but apparently also along the infused veins [18] especially when the lower extremity is the site of injection

The pathogenesis of these lesions received much attention [19] Necrosis was produced regularly with prolonged, voluminous infusions of NE in low concentrations, while single subcutaneous injections of even highly concentrated solutions failed to produce necrosis in normal domestic rabbits [20] Necrotizing lesions are seen in a much higher incidence when hemorrhagic shock is treated with NE infusions [21] In hemorrhagic states the plasma concentrations of endogenous catechol amines are greatly in creased [2] The peripheral vessels are contracted and the skin is ischemic Additional vasoconstriction in response to small amounts of exogenous catechol amines leads to necrosis

In the absence of gross paravenous infiltration venous spasm proximal to the venous cannula and reduced blood flow due to ligation of the vein distally allows stagnation and building up of high concentration of the pressor amines If the saphenous vein is used the hydrostatic pressure of the infusion fluid propels the drug into the collateral veins capillaries and arterioles leading to contraction of the vessels hypoxia and leakage from the lumen into the surrounding tissues If the contraction phase is not relieved spontaneously or by injection of adrenolytic agents necrosis occurs with thrombosis of the blood vessels

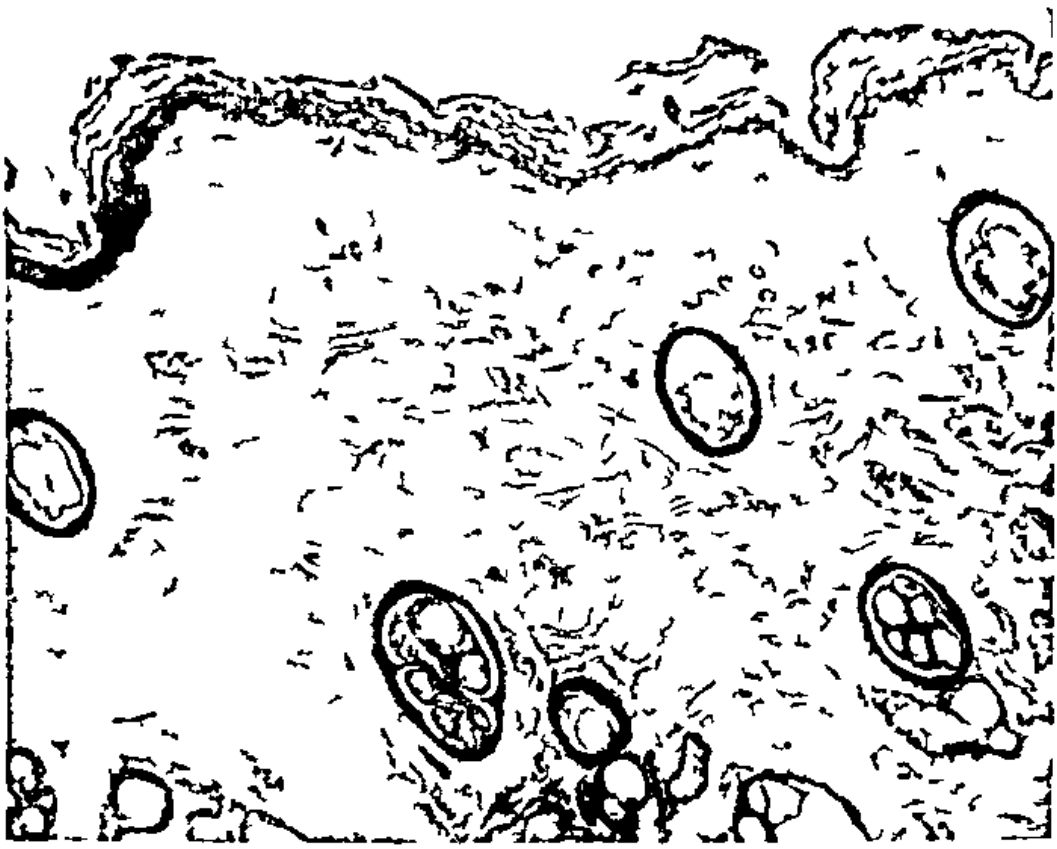


Figure 1 Photomicrograph of skin from a dog which received a 2 hour intravenous infusion of norepinephrine (12 mg/1 000 ml of 5 per cent dextrose in water) The section compares the normal (left) with the adjacent normal skin (1 ft) Note the marked fragmentation of collagen bundles the dermal and the loss of nuclear staining properties in the basal layer of the affected epidermis (Hematoxylin and eosin ×40)

The gross appearance of the lesion gradually progresses from a blanched skin to edema with purplish discoloration vesicle formation and gangrene Microscopically marked edema swelling of collagen fibers moderate leukocytic infiltrate and some red blood cells are seen in the dermis (figs 1 and 2) The epidermis shows suprabasilar cleavage with acellular vesicles The nuclei gradually lose their basophilic staining capacity

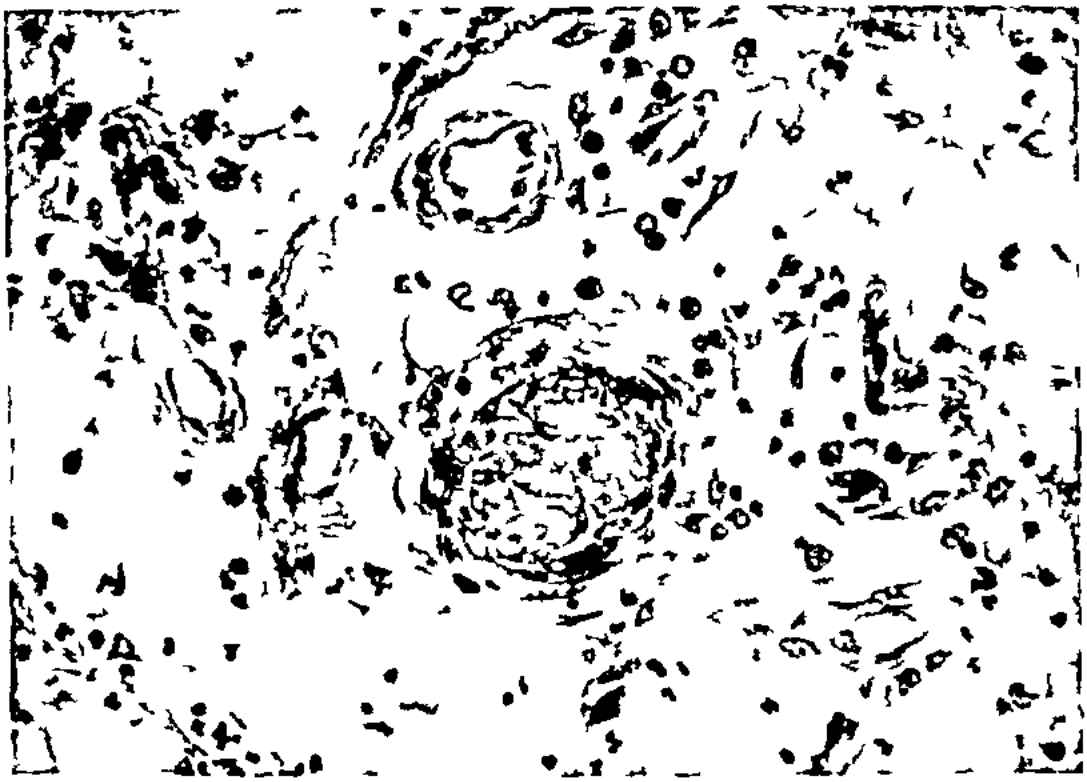


Figure 2 Photomicrograph of subcutaneous tissue from the same specimen as figure 1 demonstrating vascular thrombosis and inflammatory infiltration. (Hematoxylin-eosin stain ×240)



Figure 3 Ischemic necrosis in a 23-year-old woman following no epinephrine foreign lieu after debridement and before grafting showing exposure of tibia. (Courtesy of Capt J R Connelly MC USN[23])

Epidermal necrosis and slough are usually associated with involvement of the deeper layers the extent of the lesion being determined by the degree of vascular involvement

Occasionally the ischemic necrosis will take the clinical form of dry gangrene as in a case treated by Connelly[3] who reported necrosis even of the underlying bone (fig 3) In that case thrombophlebitis was marked In our experimental material on normovolemic dogs using polyethylene catheters phlebitis consisted of only moderate leukocytic infiltration of the vessel wall without occlusion even when the infusion was continued for 16 days



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Effective prevention of skin necrosis hinges on the use of long venous catheters and fast dilution of the pressor amines in the circulating blood This usually can be but not always

accomplished by passing a polyethylene catheter through the antecubital veins cephalad to larger vessels [24 25]

Mucosal lesions following inhalation of 1 per cent epinephrine solutions were described by Galgiani and associates 20 years ago This solution has been commonly used by asthmatics for relief of bronchial spasm The lesions consist of complete slough of the tracheal epithelium with a lymphocytic infiltration of the submucosa The same physicians observed multiple small

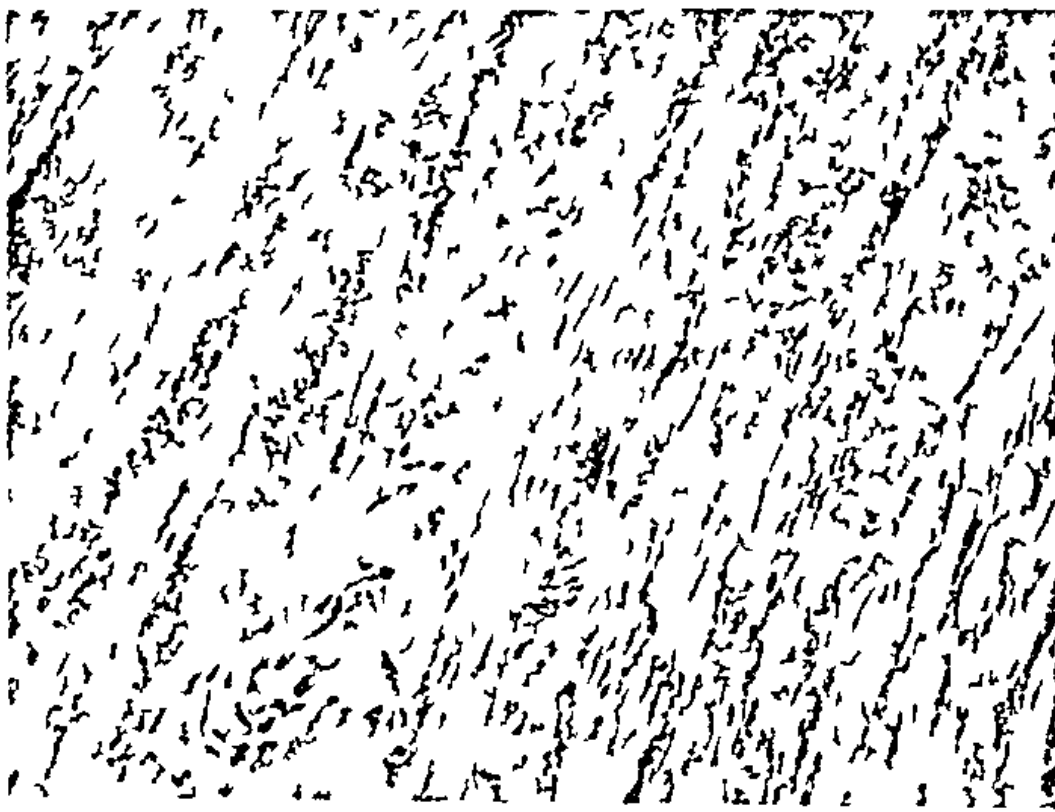


Figure 5 A c oss s ct on f om a dog s heart infused with no p ephrine at a at of 1 4 mcg/m /kg fo 17 hours. Note the myocard al hemo hage The les ons a e mo e ma ked n the s bendocardial area but by no means l ct d to t

ulcerated and hemorrhagic areas in the gastrointestinal mucosa of cats which had received solutions of epinephrine orally These lesions were accompanied by inflammatory changes in the intestinal wall and peritoneum Norepinephrine has little value as a bronchial dilator therefore it is not indicated for inhalation therapy and its possible local necrotizing effect on mucosal surfaces has little or no clinical importance

THE CARDIOVASCULAR SYSTEM

The cardiovascular system is the first to show gross patholo_ic changes on intravenous administration of the catechol amines The gross appearances of the lesions and the manner in which they are produced vary with the infusion rate of norepinephrine This has been borne out by recent quantitative work from this institution which will be the subject of a separate report High rates of infusion in dogs (10 15 mcg/min/kg of NE) produce sudden increase of mean blood pressure up to and exceeding 300 mm of mercury imposing severe mechanical injury on the mitral valve The valve at its attachment becomes massively hemorrhagic althou_h rupture has not been ob erved (fig 4)



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Dosages correspondin_ to the therapeutic rango in man (from 1 1 5 mcg min/kg of NE) produce mean blood pressure increases averagin_ 30 mm of mercury in unanesthetized dogs The pressure response in these animals is not sufficient to produce acute mechanical injury in the valves and the development of myocardial lesions is a function of time Two thirds of the animals that received therapeutic dosages developed gross chan_es after 10 hours of continuou infusion The early changes consisted of myocardial hemorrhage more marked on the endocardial surfaces with minimal or no involvement of the cardiac valves

(figs 5 and 6) Later changes consisted of focal areas of myocardial necrosis (fig 7) By the end of 1 week, a cellular reaction was present Morphologically the criteria of myocarditis were met and this term has been applied to these experimental lesions by earlier investigators[26, 27] and ourselves These lesions gradually progressed to focal fibrosis and endocardial thickening in about 6 weeks



Figure 7 Photomicrograph of myocardium from a dog treated with norepinephrine at rate of 1 5 mcg/min/kg for 24 hours Note the marked myofibrillar degeneration the presence of some inflammatory cells but complete absence of hemorrhage (Hematoxylin-eosin stain ×240)

Smaller dosages, 0 8 mcg/min/kg of NE produced no gross lesions but when continued for several days resulted in focal areas of myocarditis

These data correspond with clinical observations, both in patients treated with NE and those suffering with pheochromocytoma (figs 8 and 9) Pheochromocytoma by its chronicity, produces myocardial hypertrophy, necrosis and myocarditis which is sometimes indistinguishable from infarction Scattered areas of fibrosis appear in later stages

The pathogenesis was explained by Raab[2] on the basis of myocardial hypoxia produced by the catechol amines A large group of substances with high redox potential quinones and particularly catechol amines increase the oxygen upta

cells but this oxygen consumption is uncoupled from phosphorylation and wasted The arterioles capillaries and surrounding tissues absorb the catechol amine and increase the oxygen uptake This produces a progressive oxygen debt loss of potassium and accumulation of lactic acid in the tissues along the distal portions of these vessels Ultimately hypoxic necrosis results



Figure 8 Photomicrograph of myocardium of patient with pheochromocytoma Note the active focal myocytosis (Hematoxylin-eosin × 160) AFIP Neg 647330 Armed Forces Institute of Pathology

The arteriolar walls of the coronary system appear to be most susceptible to these effects These vessels are the earliest to show fibrinoid degeneration and necrosis However we have observed such lesions in the vessels of the gastrointestinal walls after prolonged infusions A remarkable reaction of the arterial intima is endothelial proliferation that occurs with chronic administration of catechol amines (figs 10 and 11) This process widely studied for its importance in atherogenesis

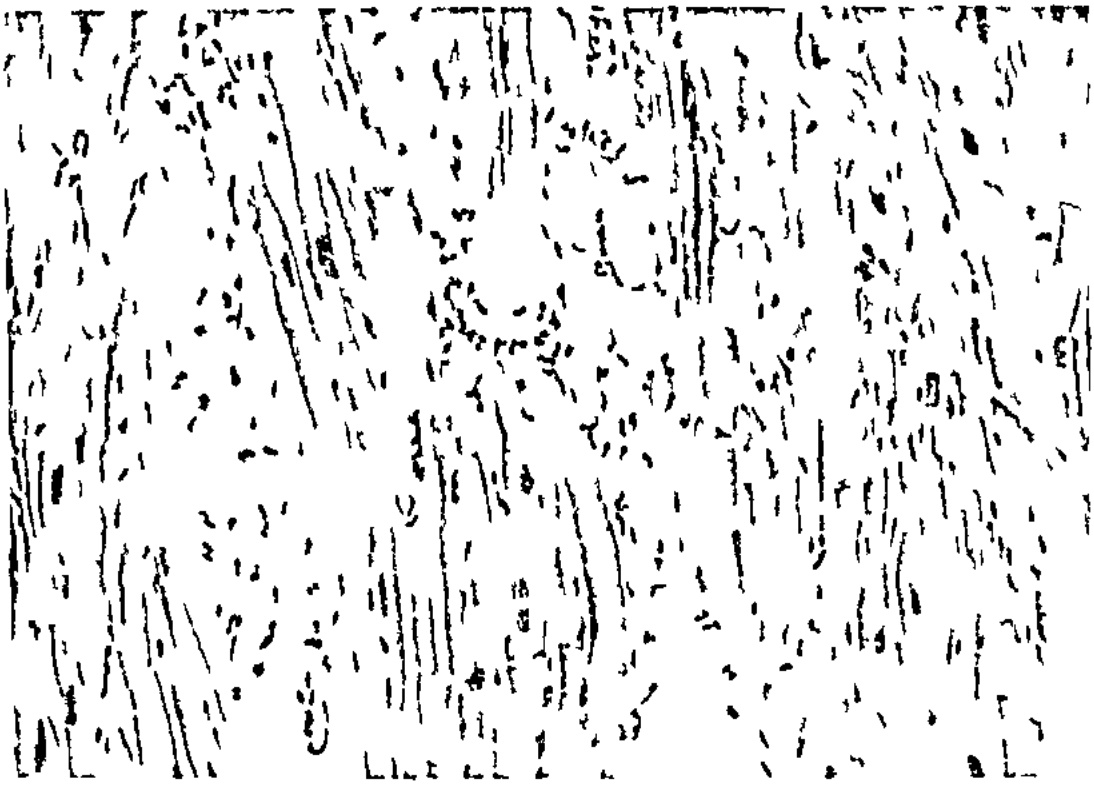
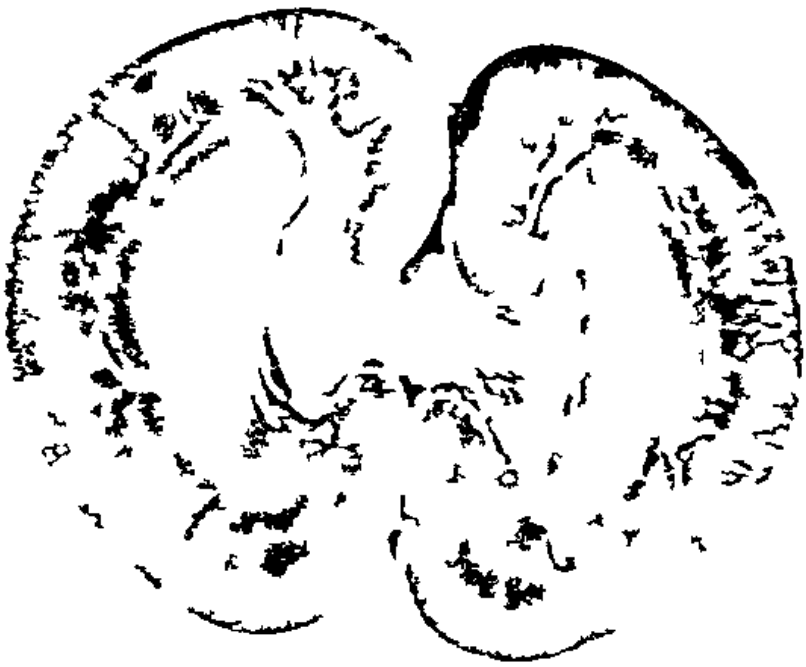


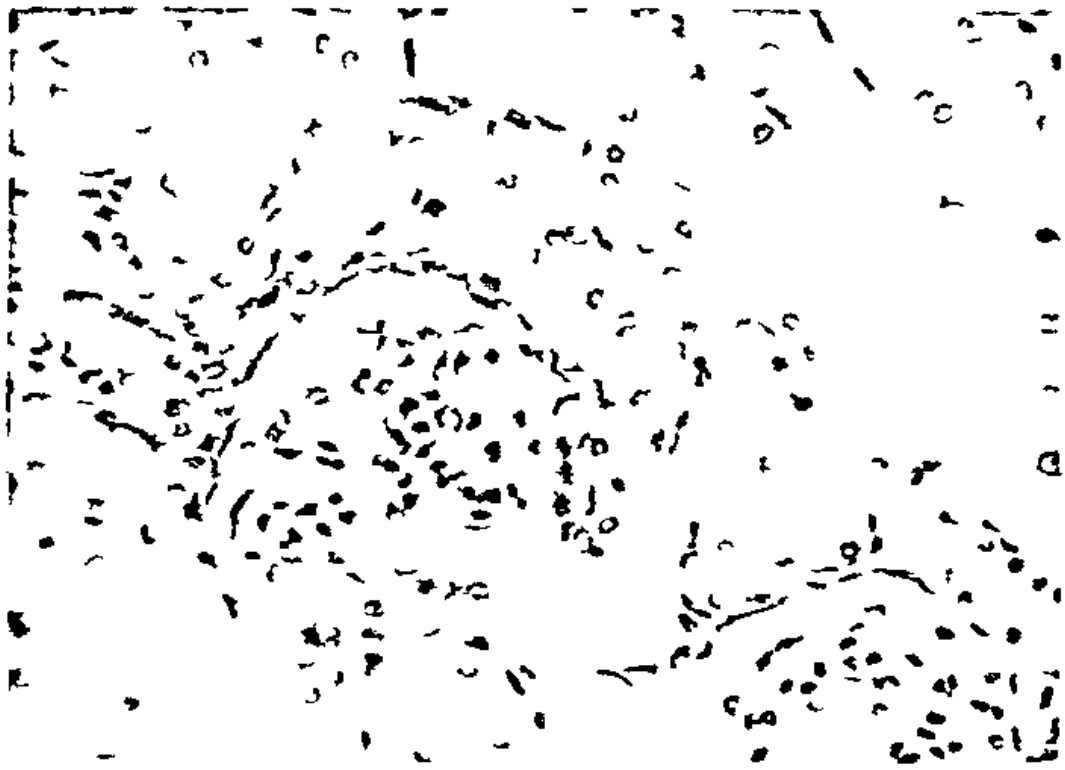
Figure 9 Myocarditis in a female patient treated with norepinephrine for several days (Hematoxylin-eosin stain ×120)



Figure 10 Severe luminal proliferation in an intestinal arteriole from a 9 year-old child with pheochromocytoma. (Hematoxylin-eosin stain ×440)



F gure 1.. h drey from a dog t eat d u th moren mephr ne at a at f 3 mcg/m n/kg for 48 hours. Not the l wear hemorrhag the co t conea llary junct on.



F gur 13 H gh-powe ew f cort x from he kid ey lla trated f gure 1.. N t th engorgemen f t an llari and ew l s, the protenace pr at Bowman sp ul and degenerat on of the t bular thelium. (H mat xylin-eo t 40)

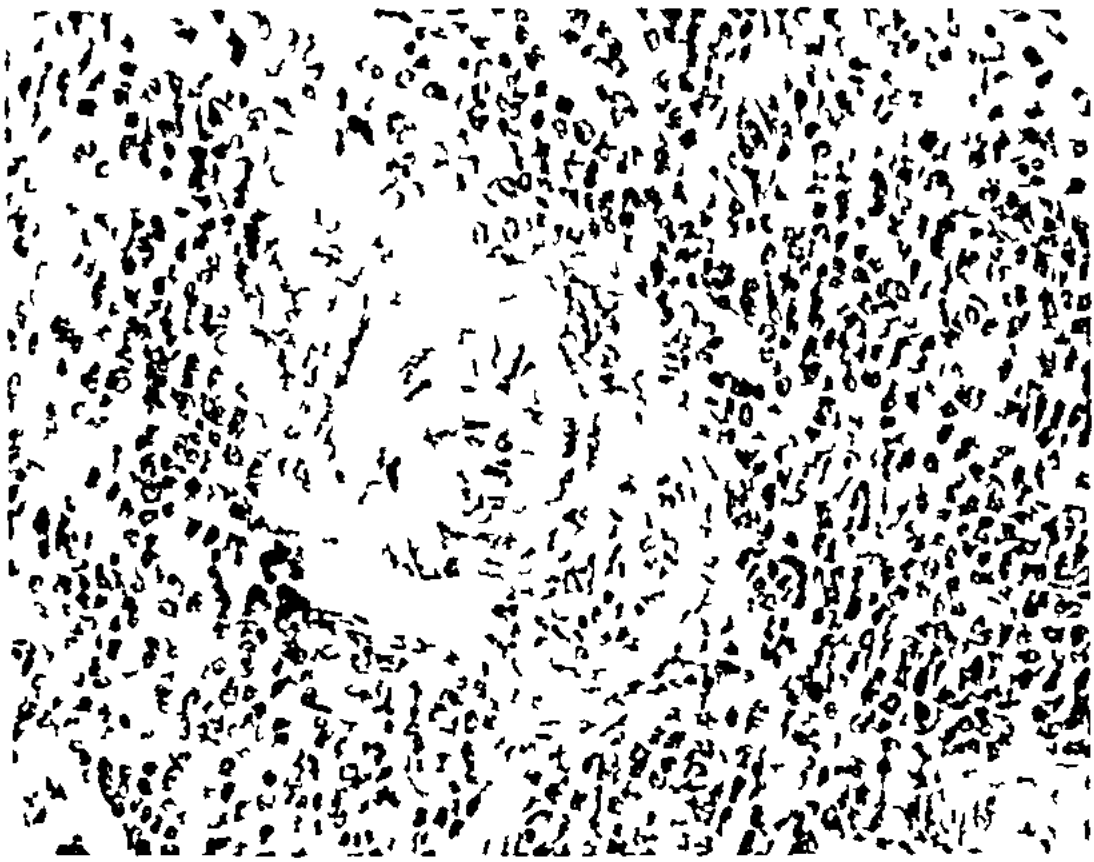


Figure 14 Photomicrograph of spleen from a dog treated with norepinephrine at a rate of 10 mcg/min/kg for 3 hours Note the marked hyaline degeneration of the arterial intima in the center (Hematoxylin eosin stain ×260)



Figure 15 Dog brain illustrating the massive hemorrhage into the cerebral cortex following norepinephrine infusion at a rate of 10 mcg/min/kg for 3 hours.

4 G ff T C W bb W R L S S Hardy J D d McR M. J J Eff t f p ph i (l ph d) ur l f t nd d llg mi hock *Surg Forum* 9 4 6 1958

5 S k J E nd C A l pl phr myoc d *Am. J Cl n. Path.* 30 425-434 N 1958

6 B ught G A d S mm S C R l h ng i hock t ted w th l rt l (l ph d) *Am. J Cl n. Path* 27 29 34 J 1957

7 B un J G E km P L nd C mpbell J D I ng p l f pl i d l *New England J M d.* 257 52 56 J ly 11 1957

8 G lg i J V P h F D k W d T i t M. L L l d y t mi ff t f m i h l t f tr g lut f p phri *J A. M. A.* 112 1929 1933 M y 13 1939

9 G m H Ca f f l p ph i ti *Ug k. f laeger* 101 242 245 F b 1939

10 H l E d Th m K Todli h Ad li giftung *D ut he Zt hr f d. g g hil M d* 33 119 123 J ly 1940

11 R b W N ur h m l h g i *Am. J Card iogy* 1 113 120 J 1958

12 C p G d M gna B S ll p t p im l d d l orad l na (t p) G *l n. med.* 32 568-575 M y 1951

13 F i dm B O t Y T nd D i O F *Eff* t f t l d pineph l p m l p thy *A b. Internat Pharma odyn.* 102 226-234 Jun 1955

14 S k J E d Mehlm B Eff f p l g d l or pi ph i fus th d d g (U p bl h d p)

15 P l G Cl i d i d ll lpod m li i d nal t *f l l* 35 1639 A g 1928

16 D l g R A J d Apg V U f ph ph (l l) p d g w h pe i l f oc t tho lumb ymp h my *Ann. Surg* 133 37 43 J 1951

17 Cl A S d F k lt W H C c i due or pi phri ly f port d d urgic l tr tm t W *consl M. J* Ma 1958

18 K p E R H imo i H d S m B Sk i f ll wing l t no us f p phr po *Surgery* 36 822 825 O 1954

19 Sh pi R A d P l w S Ski i f ll wi g f or pi phr por f 6 c *Am. J Surg* 92 566 570 O 1956

20 McC J T d S hlug J Ski l gh i d w th l ph d p ho- g p t d m *Am. J Surg* 92 594-602 O t 1956

21 Cl A S F k l W H d Ko y R C. C i d t p phr m h m d p *Ann. Surg* 147 44-50 J 1958

22 W D T A l bl d pi ph l l l duri g h m h gi hyp i d g *Am. J Phy l* 184 271 274 F b 1956

23 Co lly J R P l mmun i

24 d Al R R Nyh L M M nd K A H ki H. N nd Ze h R K Ti d w h l no p ph i dmi i t t *Am. Surg on* 23 619-635 July 1957

25 P l L W ldm S nd Rh d M. G P bl m f l nol (l ph d) pe im tal tudy *Am. J M. S* 236 755-766 D 1958

26 Fl h M. S d L b L E p im l my d i *Ar h Int Med.* 3 78-91 F b 1909

27 Ch H A Sm th R M. J W lk T C E p time l d l d *Ar h Int M d.* 8 468-551 1911

28 R b W Th Adr tg -ch li erg tr l f d me bol m nd f oc i *D bl Card.* B 1 1 65 152 1956

29 D w R B R B H. nd S k J F I t tinal bl ed g nd pe f mpl m w h oc A p d f p bl by *Ann f f Sur ery*

30 S m P C T h g f ll w g i i nous i jectl of p phr hyd hlor d d g *Ar h Path* 13 745-755 May 1932

31 Sil T F d Som S C R l b p y h g wi h ph ochr mo yt ma *Am. J M d. S* 236 00-704 D 1958

32 Euler Ch lpi U S H von *N adrenaline* (Americ lecture seri s *No 261)* Charl s C Th mas P blish r Springf ld Ill 1956 pp 193 197
33 V llery R dot P Alv aux F met M a d D lamar J Edem aigu d poumon et n phrit sur ig conda tes a l inj tion m ssi d adrenaline ch z le l pin *Ann. d m d.* 32 392 409 D c 1932
34 Hat her C R Jr Gagn J A Clark R W nd G ever E F Ac t r ver ible nd irr ver ibl ten l insuffici y in dog A r producible l boratory pr p r ti (U p blish d r p rt)
35 Appl baum J L C r br va cul r cid nts followi g pinephr n inj cti ns report of 2 c s s *J Allergy* 15 392 394 N v 1944
36 Keeney E L H mipleg a foll wing i j ction of pi phrine hydrochloride *J A. M. A.* 112 2131 2132 May 27 1939
37 Fl n r M and Sch eid r B *Subar chnoid hemorrh g f llow ng inj ction f* pinephr *Ann. Int M d.* 12 876-882 Dec 1938
38 Stief A d Tokay L Further c ntribution t hy top thology of e periment l adr nal to ic ti *J Nerv & M nt. Dis* 81 633-648 June 1935
39 Erb W H C r b l h morrhag n rabbit foll wing p ephrine inj ct ons *B tr z path Anat. u. z allg Path* 7 500-514 1905
40 C ss B G tfr und W nd Mo dy M D monstrati n of e tr l ervous m d t on of acute p lmon ry edema produ d by tra enously administered pin ph *Proc. Soc Exper B l. & M d.* 93 251 N 1956

DIET DURING LACTATION

The problem of lactation is one which is particularly important and often neglected Obstetricians have a strong tendency to stress the importance of a good diet during pregnancy and to neglect to check the diet during lactation Yet the daily accretion of tissue during pregnancy represents a much smaller nutritional stress than the secretion of large quantities of milk (850 milliliters milk corresponds to about 1 000 calories) The lactation period also usually represents a time of return to normal activity in fact very often it is a time of increased physical activity In addition to previous commitments the mother must take care of a small baby so that caloric compensations by inactivity no longer occur The pregnant woman could not ignore her physiologic state especially during the last trimester of pregnancy and took care of herself for fear of harming her unborn baby however the lactating mother has a tendency not to worry any more about her nutrition even though she has to provide more protein more calcium et cetera Too often she wants to get back as fast as possible" to her prepregnancy figure The physician must remember that the caloric requirement during lactation is dominated by the amount of milk output For satisfactory lactation the increment over the normal intake should be not less than 800 calories per day —Jean Mayer Nutrition in Clinical Medicine Calories *Postgraduate Medicine* February 1959

HUMAN BEHAVIOR IN GROUPS

SAUL B SELLS *Ph D*

AN intrinsic aspect of human behavior in flight is that it involves the behavior of persons as members of organized groups in which there is some division of labor and differentiation of roles As a result each person must depend on others to some extent for the over all accomplishment of his tasks The in flight interdependence of the crew members of bombardment refueling and transport aircraft is readily apparent Similarly the co-ordination required among the solo flying pilots of fighter interceptor flights with each other and with control stations on the ground is easily recognized The co-ordination network is greatly extended however by the participation of many specialized support agencies such as maintenance weather airways and air traffic control and others when the operation is viewed in its totality This thought was neatly expressed by an Air National Guard jet pilot in the words You can t set a record by yourself after a record shattering F 86 F flight from Los Angeles to New York in 1954

In recognition of the interdependence of human behavior in organized group situations terms such as teamwork leadership morale and co-ordination have high status as desired values in human affairs Systematic understanding of the behavior processes by which they may be achieved however has been slowly acquired and is as yet meager It is gratifying that a vast amount of research effort is currently being directed at these problems and that some substantial results can be reported at this time In selecting material for this report precedence has been given to research actually concerned with the behavior of flight personnel in flight operations As a result only a few other references have been made to the substantial and growing research literature on group behavior or to the broader aspects of co ordination involved in the operation of the over all flight organization Those desiring general references in these fields should consult works such as Cartwright and Zander s *Group Dynamics* Lindzey s *Handbook of Social Psychology* and McFarland s *Human Factors in Air Transportation* The Office of Naval Research

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issued a bibliography of unclassified research reports in group psychology

With this limitation, let us consider first some semantic problems related to research in this field and a frame of reference to assist in organizing and interpreting the material to be presented

SEMANTIC PROBLEMS

A great deal of confusion has resulted from the imprecise and often misleading use of terms related to group behavior, as for example, leadership and morale One problem is related to their functional purposes Such terms can have systematic explanatory meaning only when they refer to dimensions of group functioning, but they are often used to describe specific behaviors of individual group members

Leadership in an organized group, is the general function of facilitating the movement of the group toward the accomplishment of its designated goals that is, of expediting group effectiveness The behaviors of various designated persons, in this respect, must depend on the nature of the task, the people involved and the goals Thus the leadership behaviors required of an aircraft commander, a squadron commander and, say, a hospital commander, may be quite different, and may also vary under different task conditions

Similarly, *morale* represents attitudes associated with membership in a group, which reflect the cumulative satisfaction of group members derived from their participation in the group It should not be confused with other concepts, such as general level of individual adjustment, although these are related It cannot be specified by a particular list of behaviors, but rather depends on the relation of individual behaviors to the status of functioning of the group Thus people in an organization might be happy but either mission oriented and effective or not, and evaluation of their morale would be different in these cases

If a recent report by Fruchter, Blake, and Mouton[6] were taken at face value, one would conclude that leadership is highly, but negatively related to B 47 crew effectiveness, as rated by superiors and wing standardization boards It is of interest that in this study the ratings of leadership were based on specified behaviors, principally of aircraft commanders, such as putting other crew members at their ease, making crew membership more enjoyable, and accepting responsibility The authors themselves questioned the appropriateness of such behavior by a bomber commander to his military mission and cited similar results of a study of B 29 crews in combat, by Halpin[7] However, Halpin used the more appropriate term, *consideration* for the same behavior, which he, too, found to be negatively related to effectiveness ratings of aircraft commanders by their superiors Halpin

properly referred to this finding as a dilemma of leadership inasmuch as the more the commander pleased his crew, the lower he tended to be rated in effectiveness by his superiors

A similar finding was reported by Smith in a study of B 17 groups based in England in World War II whose mission involved the bombardment of heavily defended targets in Germany Smith compared groups selected as highly effective and highly ineffective in terms of bombing results and found that morale defined as feelings of well being and cohesion reflecting enjoyment of group participation was low in the effective groups and high in the ineffective groups On the other hand, in the most successful groups cohesion was found but it was centered around the mission emphasizing military combat duties rather than social and recreational activities They were welded together with a common purpose but this was to get their job done and get home Group cohesion did not appear as an end in itself and other purposes incompatible with the mission such as safety and survival were kept in check

Smith concluded that superior performance in a combat bombardment group is more likely to be achieved if the designated leader (1) stresses mission objective over all other considerations (2) is not himself overly identified with the personnel of the group to the point where this identification interferes with the mission and (3) achieves a high degree of cohesion confidence and co operation but not necessarily morale in the sense of well being This ruthless emphasis on the mission was truly a dilemma of leadership which many combat commanders found too difficult to accept It was dramatically portrayed in the play Command Decision

The work of Fiedler supported by the Office of Naval Research, throws further light on these problems Fiedler s research, based on groups as diverse as high school basketball teams student engineer surveying crews and B 29 bomber crews produced a number of consistent results One of them related the group s perception of its mission to the attitudes of group members toward each other For example basketball teams that were high in league standing and competing for top honors tended to prize competency ahead of social participation while low standing teams placed more emphasis on being a good fellow These variations which correspond with those observed by Smith with respect to morale attitudes of B 17 groups illustrate the importance of situational specifications in the study of morale

With respect to superior subordinate relationships Fiedler emphasized the importance of the interaction between the two in relation to effectiveness If the superior is outgoing and approachable and tends to get too friendly with his subordinates (that is identifies with them too much) he may find himself unable to make clear cut decisions If the organization has rigid

barriers between ranks and is part of a highly disciplined system, however, such a superior may be more effective In contrast, an aloof superior who isolates himself from his subordinates may lose touch with the group Such a superior, however, may be more effective in a situation where rank barriers are relaxed Hence the relation of consideration, as a variable describing superiors' behavior, to group effectiveness should be expected to depend not only on the requirements of the mission but also on the nature of the group membership and group structure, as reflected in attitudes of group members toward each other

The principal lesson in semantics that we can draw from this discussion is that in the study of group behavior a distinction must be made between terms used to describe human behavior, such as consideration, identification, co operation, and terms used to describe group functions, which are essentially abstractions, such as leadership, morale, and group effectiveness The task for psychologists and social scientists, with reference to the goal of clarifying the principles of group behavior, is to relate behavioral concepts to the abstractions of group function Inasmuch as the problem is to explain group function in terms of behavioral data, it is essential that concepts of group function, such as leadership, morale, and group effectiveness, be employed to define criteria, while the predictions are based entirely on behavioral data

Another important semantic point concerns the use of words to represent particular aspects of behavior Throughout the literature in this field, terms are assigned to represent particular attitude, role, and behavior scales which are necessary for communication purposes but often imperfect symbols of the behavior described Until a standardized taxonomy of behavior description is achieved, which at this time is certainly not imminent, extreme caution must be exercised in the comparison of results of different studies on the basis of the verbal symbols only, without reference to the supporting behavior descriptions

FACTORS IN THE STUDY OF GROUP BEHAVIOR

All behavior represents the interaction of the person and the environment in which significant variance can be attributed both to the abilities, habits, and dispositions of the person and the pressures and forces exercised on him by the environment In group behavior many of the significant environmental forces are derived from the structure of the group as it channels communication of information to various persons, defines prestige, power, and influence, and determines the roles that persons play in the concerted effort of the group

The practical application of psychologic principles of group behavior in flying activities lies in the understanding of factors in organization and interpersonal relations that may be used to increase group effectiveness From this point of view it becomes necessary to consider not only the characteristics of the per

sons who comprise group membership and the various aspects of group structure but also the purpose goals or mission of the group on which the concept of effectiveness depends

There are then three dimensions of group functioning which interact and must be considered in interrelation in the study of human behavior in organized groups Keeping in mind the practical application aspect these dimensions may be regarded as subject to external control by top management and this is reflected in the following terms which will organize the balance of this discussion 1 Group goals define the mission in terms of the task objective set for the group and the priorities and cost limitations under which they are to be accomplished 2 Group staffing defines the constitution of group personnel and therefore the upper and lower limits of their potentiality in terms of the abilities and capabilities of the individual mem bers 3 Group utilization of personnel refers to the nature of the work environment provided for the group and hence it defines the extent to which the potentiality of the group may be realized

The interrelation of these factors is illustrated in a very im pressive report by Paterson [1] who although a radar control officer was assigned by his station commander to attack the problem of a dreadful and destructive accident rate at a Royal Air Force fighter station during World War II Available evidence suggested that the accidents represented careless errors of judgment rather than accident proneness and Paterson ap proached the problem by efforts to increase group cohesion and to achieve a group norm of good flying for pressure to conform After observing and analyzing conversations among pilots and other personnel he decided that it was frustration of the desire to get into battle that was responsible for the prevalent irritability carelessness and lack of team spirit and that this might be overcome by giving the pilots something to fight symbolic of the enemy Since constant bad weather pre vented the pilots from engaging the enemy in battle the weather was on the side of the enemy and could be made symbolic of the enemy The station might fight the enemy by fighting the weather

The account of how he identified the respected influential members of each group whom he called exemplars and working tactfully and unobtrusively through them set in motion group interactions which gradually affected everyone on the station with a common purpose is one of the thrilling anecdotes of the war In addition in discussion of his successful efforts to re duce aircraft accidents which have since been tested as well in industrial situations Paterson made a number of important theoretical observations With reference to team spirit and team work he emphasized the importance of morale based on appreci ation of the common purpose and knowledge that everyone in his role is doing his bit Teamwork, the co-ordination of the various functions depends on the development of such morale,

although "leaders or experts" are necessary to that co-ordination But not only is it necessary to have one person tell others how to perform their functions They also must know something of the way in which their functions are co ordinated, which is the background to the popular interest in communication and liaison

On *group structure* and *roles* he pointed out that

> Not only was appreciation of functional coordination necessary, but also appreciation of the persons performing these functions that is estimation of role Function, hence role has no meaning unless it is one of a structure of functions necessary to achieve the purpose of a group If a man performs no function of significance to a group he cannot be a member of that group Thus at Bogfield there could be no room for one who did not perform a function which helped in some way to put an aircraft and its pilot into battle with the enemy If the word "work" is taken to be synonymous with job " then work may be said to refer to what a man does when what he does has functional significance his contribution to the group activity A man working fills a role He and his role are identified and in this he becomes a meaning to society Unless there is a structure of functions work is not meaningful For a sense of belongingness role hence structure is essential Belongingness gives security [10]

Thus we can see that behavior of persons as members of groups and their collective behavior in groups reflects the complex interaction of many variables which we have grouped logically in the three categories group goals, staffing, and utilization The research summarized in the remainder of this discussion illustrates a number of variables related to staffing and utilization In each case, however, the results must be interpreted with reference to the established goals of the particular group and the particular perceptions of them found among the members of the groups as well as with reference to all other conditions of staffing and utilization not specifically isolated for study The fact that relevant variables are not always taken into account by investigators does not alter their relevance or effectiveness

CRITERIA IN MEASUREMENT OF GROUP PERFORMANCE

One of the most baffling and elusive problems in personnel research has been the development of appropriate, reliable criterion of performance Measurement of group performance is necessary to evaluate the effects of various factors presumed to account for group performance

Research primarily with B 29 crews by the Combat Crew Training Research Laboratory at Randolph Air Force Base gives a rather discouraging picture of a number of the factors of bomber crew performance For example, [illegible] who studied 600 B 29, [illegible] results such as the following

Rada bomb ng c rcul r errors obtained by the radar bomb system (RBS) showed a corrected odd even miss on reliabil ty of 33 Attempts to increase reliability by correcting for t rget and mission differenc s presence of instructors and cond tion of radar s t were unsucc ssful

1 Mean circular rrors on the ultrasonic (gro nd) trainer h d a reliability of 47 and questıon ble valid ty n rel tion to radar bombing scores in flight

2 Target identification scores on simul ted visual bombing missions (visual camera scores) had rel ability of 20 which was believ d to be inflated by instruct r estimat s in scoring Circular errors in actual v sual bomb drops had a reli bility of 18

3 Average errors in making good control time showed a reli ability of 49 with some indications requ ring verif cation that these errors relate meaningfully to mission diff culty and stage of training

4 G ound school written exam natio had relati ely h gh Kuder R ch rdson reliabilities (60 to 91) in the c es ex mined but these fa led to correlate meaningf lly with objective in flight measures

These results are representative of efforts to obtain satis factory objective measures of flight crew performance On the otl er hand ratings of crews by superior officers and by standard ization boards l ave proved reliable in a number of studies al though not related to objective measures Knoell French and Stice [1] for example obtained several types of ratings on combat performance in the Far East for 108 B 29 crews which had trained initially at Randolph Air Force Base Their results showed

1 That ratings by squ dron comm nders and n some cases wing fficers were sat sf ctory as to nter rater agreement How ever altho gh nin dimensions were rated factor analyses re vealed that they were accounted for by one general factor

2 That similar r ti gs of i div du l performance were mo t s tisfactory for aircraft comm nders nav gators r dar operators and flight engineers ratings of copilots bombardi rs radio oper ators and gunners d d not reach satisf ctory levels of agreement

3 Th t ratings of flight crews by ground crews assigned to th ircraft offer a rel able source of rat ng inform t on although these tings did not correlate sign ficantly with anything else

In view of their demonstrated reliability and authoritative status in the operating affairs of the organization superiors ratings have in one or another form been used in most of the research known This is probably more expedient than satis factory however and the criterion problem remains an important and challenging area for continuing investigation

RESEARCH ON STAFFING PROBLEMS

Technical Competence

The most important single factor controlling the assignment of personnel to any flight crew is technical competence Although, from the standpoint of crew effectiveness, the possession of a minimum standard of technical competence may be regarded as a necessary rather than sufficient requirement, the study of Fruchter, Blake, and Mouton[6] reported a positive, linear correlation of 43 between crew members ratings of each other on this factor and the superiors' rating criterion These ratings were based on such items as frequency of errors in the air, competence and interest in technical specialty, satisfaction with performance in both air and ground activities, and consistency of performance

There is some impressive evidence, from another study of B 47 crews, that crew members approval of the technical competence of other crew members is not entirely a matter of individual proficiency, but also depends to a substantial degree on their experience in working together Hood and his associates[13] found that crew agreement on who does what when in flight, which is highly correlated with superiors' ratings, is a direct function of crew members' experience in flying together, the important factor is neither flying experience nor even multi jet time *per se*, but experience together as a team The importance of operational training to supplement initial crew assembly is clearly indicated and neatly illustrates the interdependence of staffing and utilization measures

Crew Assembly

The problem of rational crew assembly has received considerable research attention and yielded useful results Rational approaches imply that some combinations of personalities, backgrounds, skills and other individual characteristics may be more compatible and adaptable to effective task performance than others The literature on interpersonal attraction and selection of mates and work partners is relevant and has contributed to approaches which have been investigated A comprehensive review by Haythorn cited a number of generalizations as well supported by experimental evidence

1 Research on crew composition and efforts to assemble crews for optimal performance has confirmed that variations in crew effectiveness can be accounted for by variations in the particular combinations of individuals composing the groups [15]

2 The most successful method of assembling crews thus far has been that of self selection in which crew members express their own choices of preferred crewmates The improved effectiveness obtained by such methods is apparently a result of increased crew compatibility observed in crews composed by these methods A limitation of self selection methods has been their feasibility but this is less of a problem with smaller crews such as in the

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1 Mean circul r e r rs on the ultrasonic (ground) traine h d a reliability of 47 and question ble validity in rel tion to rad r bombing cores in flight

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1 Th t ratings by squ dron commanders and in some cases w ng officers were s tisfactory as to inter rater agreement How e er lthough n ne d m nsions were rated factor an lyses re ealed that they were accounted for by one gener l factor

2 Th t im lar rati gs of ind vidu l performance were most satisfactory f r aircraft commander navigators rad r operators and fl ght engineers ratings of cop lots bombardiers dio oper tors and gunners did not reach s tisf ctory levels of agreement

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factors in group situations which have behavioral implications and which can be measured by his "Group Dimensions Description Questionnaire." Examples of his dimensions are group autonomy, control over activities of members, flexibility of procedures, stratification by rank, authority, prestige, stability of personnel, assignments, and organizational structure, and affect associated with membership.

The Group Dynamics Approach

Although the formal structure of an organization has a profound influence on roles, attitudes, and behavior, this influence is exercised through the reactions and interactions of people in the group. In addition, many interactions occur in the form of group pressures and group standards, reflecting patterns of cohesiveness and communication among group members, which are not directly related to the formal structure. Actually, the formal structure may be considered as a plan, whether spelled out in detail or implied, and an organization in operation seldom corresponds with the organization model as charted.[2, 22]

Group dynamics is reflected by the intervention of human social factors interacting with the formal plans and other influences in the situation. The resulting work performance, attitudes, and relationships among members reflect the organization in operation. In his efforts to make the actual organization conform to the formal plan, the appointed leader is continually confronted with the task of reconciling discrepancies between what should be done and what is done, between the needs of the organization and the needs of individual members, and between prescribed and actual lines of communication. Many of the most important decisions he faces involve compromises between maximum goal achievement and the costs they imply in terms of risks of jeopardizing the organization by impairment of the welfare, motivation, and capabilities of its members.

In their introduction to the problems of group pressures and group standards, Cartwright and Zander[4] quoted Bill Mauldin's[5] book *Up Front* in which he stated that combat outfits "have a sort of family complex." That is, the men know what is expected of them and readily accept group pressures to behave in a certain way while they are group members. Mauldin stated:

> Combat people are an exclusive set and if they want to be that way it is their privilege. They certainly earn it. New men in outfits have to work their way in slowly but they are eventually accepted. Sometimes they have to change their way of living. An introvert or a recluse is not going to last long in combat without friends so he learns to come out of his shell. Once he has arrived he is pretty proud of his clique and he in turn is chilly to outsiders.[5]

This quotation illustrates identification. One of the concomitants of identification involves acceptance of group norms which

function as pressures to conform This is part of the explanation of the importance of communality of values in a cohesive group Except in the relative isolation and intensified stress of the combat group, where situational pressures and survival needs may obscure other affiliations, however most people affiliate with many groups which exercise various pressures on those who identify with them Religious social political and other group memberships not only represent basic values but also styles of living likes and dislikes concerning a wide range of activities and prestige status and resulting power and influence among associates

Some of these, which have equally important civilian counterparts are illustrated by military status categories such as rank (flag field grade company grade, warrant noncommissioned officer and enlisted) type of aircrew rating, regular versus reserve and Academy graduate versus other The importance of such status categories is clearly shown by the many symbols of status that are displayed and coveted such as insignia distinctive wings flags, badges parking spaces office furniture rugs desk sets private dining rooms cars clubs and the like These are not merely utilitarian conveniences but also means of reinforcing and displaying evidence of power prestige, and status which have implications for the behavior of their owners and their associates

In a formal organization in which authority is hierarchical co-operation is enhanced when the various dimensions of status are consistent throughout the organization Top management of an organization might well investigate many of its existing status conventions if it is desired to exploit fully these informal forces within the group For example Lanzetta and Haythorn in a study of B 29 instructor crew influence on student attitudes and performance found a decided lack of prestige attached to instructor status In view of the well known influence of prestige persons on attitudes of their associates and of the demonstrated relations of crew attitudes to crew effectiveness [11] the possibility of positively affecting attitude development among student crews by improving the prestige status of instructors appears a worthwhile problem

The effects of various forms of *interaction among aircrew members* have been studied in relation to crew effectiveness DeGaugh and Knoell[12] found a significant relation between a factor which they called pride in work group and superiors ratings of 89 B 29 groups in combat The items which identified this factor were chiefly related to liking members of one s crew satisfaction with the accomplishments of the crew and a sense of safety in flying with the crew Haythorn reported significant correlations for 103 B 29 crews which indicated that crew mean sociometric core covary with crew mean attitude scores particularly on the are dimension of pride in crew and with combat

ratings of the crew by superior officers In a later study of 42 B 29 crews which remained together from training into combat in the Korean War, Knoell[31] reported that crew attitudes measured in training and also in combat are significantly correlated with the crews rated combat performance The same interpersonal factors as reported in earlier studies, namely, pride in crew, acceptance of Air Force goals and sense of well being in the Air Force, which reflect group acceptance of the same task oriented values, were reported by Knoell as criterion related

The relations between superiors and subordinates, particularly between the aircraft commander and the combat crew, which have been studied most in the flight situation, are significant in achieving the attitudes which are most compatible with effective performance These relations are subtly dependent on the nature of the task and the mission Although no empirical data are available, it is likely that the negative relation to effectiveness of consideration and nurture by the aircraft commander among combat crews, as reported by Fruchter, Blake, and Mouton[6] and Halpin,[7] might be positive among commercial aircrews whose duties are less hazardous and stressful In his role on the crew, the aircraft commander is the source of information which affects the performance and sense of individual security on the job of his subordinates He must keep his crew informed, but the nature and purposes of his communications will be conditioned by the requirements of the situation

Research on group dynamics has repeatedly emphasized the importance of *communication of information* necessary to the group for feelings of individual well being and effective performance [32 33] For example, Riecken[3] described a work camp group where the behavior code prohibited criticism or aggression of any kind As a result, the usual minor antagonisms and conflicts enlarged because they could not be discussed until the entire group lost its cohesiveness and effectiveness Cartwright and Zander[2] pointed out that international conferences and workers at noisy jobs both suffer loss of effectiveness and cohesiveness as a result of communication difficulties unless compensatory mechanisms for communication *can be obtained* Taylor[34] found a highly effective functioning communication system in an Air Force squadron which was independently rated outstanding

In an extensive study of a mental hospital, Stanton and Schwartz[3] noted the formal organization structure and from it constructed a chart of the formal expectation of the transmission of information," which carried a small but vital part of the communications among the staff to higher administrative levels They repeatedly observed the causes and effects of the blocking" of this type of information Blocking was usually due to the overloading of these formal channels or to changes desired or not desired in hospital procedures The effect was the setting up of informal channels to carry needed facts The informal chan

nels usually were slower less accurate and more misleading but eventually a needed bit of information reached the person who needed it although frequently too late or too inaccurately for effective action

Stanton and Schwartz also found that the informal channels could be roughly predicted from a chart of the formal expectation of communication once the location of the block of formal channels was known Furthermore the informal channels were unstable due to their excessive length and unreliability They would form then break up then reform repeatedly until the blocked formal channel was reopened The persons used as intermediates in the informal channels became noticeably tense without realizing why while the two primary persons concerned were constantly seeking newer and better informal channels Whenever a block in the formally expected line of communication between staff members was removed considerably improved behavior was noted in patients dependent on the persons involved although these patients had not been directly concerned

These authors cautioned against confusing lines of formal authority with the formally expected channels of communication Forcing the use of the former for all formal communication quickly leads to blocking due to channel overloading and this in turn leads to the establishment of informal or even *sub rosa* channels which are much less effective methods of communication Thus communication should not follow but actually reinforce the formal organization through a network of expected communication derived from formal job descriptions This conclusion is supported by centuries of combat history men in actual combat must communicate not only with their superiors to the rear but also with the groups on their flanks

The more existing channels of information support the formal organization the more they reinforce the positions of the leaders and decision makers and the less likely will there be discrepancies between formal and informal power structure

Ma Machin System Approach

It is possible as some investigators have shown to ignore structure status roles and interpersonal problems and to regard an aircrew or other task group as a system in which crew members and equipment are linked and information must flow efficiently to enable decisions and responses in appropriate sequence and timing This approach is concerned with discovering the most efficient arrangements for information flow for various types of group and task

A simple model illustrating this problem is given in a study by Bavelas who demonstrated experimentally that different forms of communication structure have differential effectiveness in group performance He arranged five cubicles into each of several geometric configurations such as a star a fork a circle

and a straight line, and then placed a person in each cubicle Each was given a bit of information, which together with the other four bits of information given the others constituted solu tion of the problem The geometric pattern markedly affected the assembling of the bits of information Highly centralized fig ures, such as the star and fork, organized faster, were more stable from problem to problem and test group to test group, solved problems faster, and evolved as leader the centrally placed persons The flow of information could thus be seen to be an important resultant and determinant of how well a group functions

Roby and Lanzetta[38-4] investigated task performance in the laboratory under four different conditions of communication struc ture, ranging from that in which control agents had direct access to none of the information required to operate their own controls to that in which control agents had direct access to information for all but one of their controls They found that differences in team performance are associated with task communication struc tures even within the comparatively narrow range of the structures studied Performance efficiency increased as the structure per mitted more direct transmission of information and less dis persion Learning was more rapid with an easy communication system than with a difficult one, and replacing an interphone circuit with a telephone circuit resulted in wider differences in performance and an increase in errors

These and related studies have suggested a number of princi ples of job structure to maximize group performance in a man machine system These are (1) load balancing, wherein each member of a team is equally occupied in attaining the goal, re gardless of the importance or magnitude of the contribution or of variations in type of activity (2) autonomy of function, which implies that jobs are self contained with reference to information necessary for their performance and (3) homogeneity of function, wherein the functions performed by each job have a high degree of homogeneity with respect to information handled

These principles have implications for technical competence and therefore for the content of selection and training programs as well as structure of the organization The Roby and Lanzetta studies have shown that when they are violated to various de grees by varying the proportions of information giving and re laying requirements, decrements of performance resulted

In a study by Voiers[1] of factors involved in bombing accuracy in B 29 crews it was found that the aircraft commander and radar observer were directly dependent on one another for effec tive expression of their respective proficiencies The proficiency of each member (as measured in ground school) correlated most highly with the bombing criteria under conditions of higher than average proficiency in the other member High proficiency in the navigator appeared to compensate in some degree for lack

of proficiency in the aircraft commander and radar observer in that the navigator s proficiency appeared most highly correlated with the criteria under conditions of low proficiency in these members The results for bombardiers were inconclusive Voiers interpreted the relationship between bombing accuracy and the proficiency structure of the bomb team by means of a crude electrical analogy in which the proficiencies and performances of the aircraft commander and radar observer were represented as being in series" with one another and collectively in parallel with the proficiency performance of the navigator These observations fit in nicely with the principles of load balancing autonomy and homogeneity of function

SUMMARY

In a survey of research on group behavior oriented to problems of aircrew proficiency a common semantic problem was clarified which involves the distinction between terms descriptive of behavior and those descriptive of group functioning This was illustrated with reference to the terms leadership and morale The survey was organized in terms of a frame of reference within which top management levels might consider application of principles of group behavior to increase group effectiveness

The concept of effectiveness depends on the specification of group mission or goals which is necessary in order to define criteria of performance Group performance in relation to goals depends on staffing and utilization of personnel Staffing refers to capabilities of group members and hence the group potentiality Methods of crew assembly were reviewed under this heading Utilization refers to the work environment provided by management for the group and therefore reflects the extent of realization of potentiality Approaches to utilization considered were the structural approach group dynamics and the group as a man machine system Each of these provides a partial view of the total problem and although substantial insights have been reported from each approach their integration into a comprehensive analytic system is required The profound influence of group behavior factors in aircrew effectiveness recommends consideration of both military and civilian programs of immediate application and continued support of research

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REFERENCES

1 M ll k W Y ord by y ur If *Air For* 37 28 F b 1954
2 Ca rwr h D d Za d A. (d tor) *Gr up Dynamc R ar b and Theory* R w P & C F Ill 1953 pp 73-91
3 L d y G (d) *H ndbook of Social P ychology.* Add on-W l y Cambridg Ma 1954 V l II

4 McFarland R. A. *Human Factors in Air Transportation.* McGraw-Hill Book Company Inc New York N Y 1953
5 Office of Naval Research Bibliography of Unclassified Research Reports in Group Psychology ONR Report ACR 22 1957
6 Fruchter B Biderman R. R. and Mouton J S Some dimensions of interpersonal relations in three-man airplane crews *Psychol Monogr* 71 No 19 1958
7 Halpin A. W The Leadership Ideology of Aircraft Commanders Air Force Personnel Training Research Center Research Report AFPTRC TN 55-57 1955
8 Smith D L A Criterion for the Study of Leadership in Combat Air Groups Stanford University 1951
9 Fiedler F The Influence of Leader-Key Man Relations on Combat Crew Effectiveness ONR Contract NS-ori-07135 Technical Report No 9
10 Paterson T T *Morale in War and Work. An Experiment in the Management of Men.* Max Parrish London 1955
11 Forgays D G and Irwin L. A. Measurement of Combat Crew Performance Used in B-29 Training Air Research & Development Command Human Resources Research Center Technical Report 52-14 1952
12 Knoell D Frech R L and Stice G Criteria of B-29 Crew Performance in Far Eastern Combat Wings Air Research & Development Command Human Resources Research Center Technical Report 53-32 1953
13 Hood P D Halpin A. W Harnitchek J J Siegel L and Hemphill J K Crew Member Agreement on RB-47 Crew Operating Procedure Air Force Personnel Training Research Center Research Report AFPTRC TN 57-64 1957
14 Hayther W W A Review of Research on Group Assembly Air Force Personnel Training Research Center Report AFPTRC TN 57-62 1957
15 Rundquist S Erlick D E and Berkowitz L Some Effects of Varying Combinations of Group Member Group Performance Measures and Leadership Behaviors Air Force Personnel Training Research Center Research Report AFPTRC TN 55-83 1955
16 Roby T B Problems of Rational Group Assembly Employed in the Medium Bomber Crew Air Research & Development Command Human Resources Research Center Research Bulletin 53-18 July 1953
17 Rosenberg S and Roby T B Experimental Assembly of B-29 Crews by Self Selection Procedures A Description and Validation of the Method Air Force Personnel Training Research Center Research Report AFPTRC-TN 56-104 1956
18 Sells S B and Temple ton R C. A Experimental Manual for Matching Students and Instructors in Primary Pilot Training Unpublished document U S Air Force School of Aviation Medicine (Unpublished report)
19 Frenkel E G Motivational Values and Work Performance Selection Air Force Personnel Training Research Center Research Report AFPTRC-TN 57-73 1957
20 Dwyer P S The Problem of Optimum Group Assembly Air Force Personnel Training Research Center Research Report AFPTRC TN 56-18 1956
21 Dwyer P S Development of Generalized Mathematical Procedures for Optimal Assembly of Potentially Effective Crews Air Force Personnel Training Research Center Research Report AFPTRC-TN 56-139 1956
22 Stogdill R. Leadership membership and organization In Cartwright D and Zander A. (Editors) *Group Dynamics Research and Theory* Row Peterson & Company Evanston Ill 1953 pp 39-51
23 Berkowitz L An Exploratory Study of the Role of Aircraft Commanders Army Research & Development Command Human Resources Research Center Research Bulletin pp 53-6 Dec 1953
24 Hall R L Predicting Member Crew Performance Training Aircraft Commanders Air Force Personnel Training Research Center Research Report AFPTRC TN 56-28 1956
25 Haythorn W W An Analysis of Role Distribution in B-29 Crews Air Force Personnel Training Research Center Research Bulletin AFPTRC-TR 54-101 1954
26 Trumbo D Eberhardt S Some Consequences of Differences in Displayed Crew Effectiveness Air Force Personnel Training Research Center Research Bulletin AFPTRC TR 54-128 1954
27 Hemphill J K *Group Dimensions A Manual for Their Measurement* Monograph No 87 1956 Bureau of Business Research Ohio State University Columbus Ohio 1956
28 Maslow A H *Up From Hierarchy* Harper and Company Inc New York p 58 Quoted in Argyris 2 p 137

29 La tt J T d Hayth rn W W I tr ct r-Cr w I fl A tud F ma in S d t Cr w Air F P t l Trai ing R rch C t R ar h B ll tin AFPTRC TR 54-79 1954
30 D G gh R A d Knoell, D M. Att tud R l t t B mbe Crew P r- f m in C mb t A F P l T ining R h C R rch B ll in AFPTRC-TR 54-18 1954
31 Knoell D M. R l t h p B tw en Attitud f B mb C w in Training d Th ir Attitud d P f ma C mb A F P rs l Training Re- ar h C t R h R p rt AFPTRC TN 56-49 1956
32 Cartwright D S l p y h l gy nd g p p *Annual R P ychol.* 8 211 236 1957
33 S ll S B d T D K I H C W (d h f) *E cyl p d f Edu at nal R rch* Th M m ll C mp y N w Y k N Y (I p)
34 Ri k H. W S m p bl m f d l pm t, *Rur Soc L* 17 245 252 1952
35 T yl E R A C S dy f Squadr C mmuni ti nd It A medic l Asp ct U p bl h d p p 1957
36 S t A. H d Schw rt M S *The Ment l Hospit l A Study f Inst tut onal Partic pat on P ychiat ic Illne and T atment* B B k I N w Y k N Y 1954
37 B l A. C mmun t p tt rn in t k t d gr p In C rtwright D d Za d A. (d) *Gr up Dynamic R arch nd Theory* R w P t rson & C E Ill 1953 pp 493-506
38 La tt J T d R by T B Fff t f W k-G p Str tur d C rt in T k V bl G p P f ma A F P l Training R rch C t R ar h R p rt AFPTRC-TN 57 45 1957
39 R by T B d L tt J T An l tig t f T k P rf m F f C rt in A p t f W k Gr p St ctur Air F P rs l Training R h C AFPTRC-TN-56-74 1956
40 R by T B and L tt J T A R pl on S dy f W rk Gro p Str tu d T k P rf m Air F P t l T i g R rch C t R earch R p rt AFPTRC TN 57 85 1957
41 V W D B mbi g A ur cy F f th G und S h l P f y S ctur f h B-29 B mb Te m Air F P l T ining R h C nt R h R port AFPTRC TN 56-4 1956

TREATING THE WHOLE PATIENT

As physic ans we mu t learn to treat each patient as a whole—not as a fractio al man but as a p rson with a body that s nses pain a mind that wr stl s with fear and anx ety and a soul th t will never be completely cured unt l it has been made one ag in with God It is a grave mistake to tre t the body and the mind however wisely wh le neglecting the person h mself It is our job to help the p ti nt die in peace if he cannot get well but if he can surv ve to send h m home to h s f mily nd wo k able to resume h s pl ce in the commun ty and ready t attest to what *both* science a d h s f ith have d n to m ke h m whole gain Anyth ng short f this d s ot co stitute heal ng in the highest sense of the w rd —Craig D Ellyson A Gene l Pr ct tione E aluates the Problem of Treating the Whole P t e t *Journal of Iowa State M dical Soc ty* Septembe 1958

PULMONARY INFARCTION COMPLICATING SEGMENTAL RESECTION

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AT the present time, the mortality rate following pulmonary resection in the treatment of tuberculosis is very low in deed—an impressive and highly favorable rate never considered possible a few years ago [1] Such imposing results, however, are not evident when untoward morbidity and complications following resectional therapy are analyzed The magnitude of these problems is reflected in the voluminous literature, which has appeared since 1946, dealing with postoperative complications

Early in 1954, one of us (J M S) was impressed by the gross appearance of a subsegment of pulmonary parenchyma seen at secondary thoracotomy which had the gross characteristics of infarcted tissue this subsegment comprised approximately half of the raw surface of the remaining anterior segment of the right upper lobe following apical and posterior segmental resection of tuberculous residuals 10 days previously Numerous alveolar air leaks producing a tension pleural space and prompting the secondary thoracotomy, were visualized over the irreparably devitalized subsegment of lung an intersegmental vein coursing over the infarcted lung was thrombosed without evidence of proximal ligation incision into the discolored subsegment produced no bleeding This necrotic lung tissue was easily removed from the underlying normal subsegment, by traction and blunt dissection down to the subsegmental bronchus which was divided and closed no appreciable surface air leaks were then evident, after which a limited modified thoracoplasty was performed, with underwater seal pleural drainage Subsequent recovery was uneventful The pathologic diagnosis was "infarction of lung tissue no evidence of a specific granulomatous process "

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Since becoming aware of this problem of localized postresection infarction of the lung 390 additional segmental resections have been performed at Fitzsimons Army Hospital Following these procedures 14 patients or 3 6 per cent have developed complications similar to those related above Apparently this pathologic entity has not occurred in the experience of many thoracic surgeons or has progressed to the stage of bronchopleural fistula empyema or hemorrhage before secondary corrective surgical measures are undertaken

During this four year period we have become increasingly familiar with the clinical and roentgenographic characteristics of this postoperative complication and with the method of management we consider proper when such difficulties arise Suggestions as to prevention will be presented

REVIEW OF THE LITERATURE

In regard to the surgical anatomy of the pulmonary vasculature Appleton in 1944 was impressed with the degree to which segments of the right upper lobe were supplied by trans segmental arteries In 22 per cent of 50 cases in his study the posterior segment was supplied by recurrent branches of the apical segmental arteries In 8 per cent the posterior segment was fed in part by branches of the anterior segmental arteries Similarly the apical segment received its blood supply partially from rami of the anterior segmental artery The anterior segment received additional branches from either the apical or the middle lobe arteries in another 8 per cent of specimens From such findings it may be concluded that the possibility of impairing the anomalous arterial blood supply to an isolated upper lobe segment is not insignificant In addition Appleton was the first anatomist to relate the pulmonary veins to the intersegmental surface and speculate upon their surgical significance

Unfortunately the understanding of the pulmonary vasculature is beset by the difficulty of multiple terminology and various investigators have attempted to improve the situation in different ways Overholt and co workers suggested that the venous drainage of the bronchopulmonary segment consisted of lobar veins having both segmental and intersegmental tributaries Boyden felt that this was oversimplification but surgically significant in dissection of the intersegmental plane

The technic of segmental resection was gradually perfected after the anatomic concept of the bronchopulmonary segment was advanced In 1939 Churchill and Belsey[4] reported the employment of this technic in the surgical treatment of bronchiectasis the underlying aim being to preserve as much normal lung tissue as possible Clagett and Deterling also adapted this technic

to the lingula for the treatment of bronchiectasis The first significant series of segmental resections in the management of pulmonary tuberculosis was reported by Chamberlain and Klopstock,[7] in 1950 They recorded 72 cases so treated and were encouraged to continue its use noting that there was a decided decline in the number of postoperative complications as their technical skill and postoperative care improved

Clagett,[6] appreciating the anatomic concept of the broncho pulmonary segment, applied the "traction" dissection technic, beginning at the hilum a method, with slight modifications, employed by most thoracic surgeons today Initially, Clagett infolded the raw surface area a procedure which apparently led to numerous complications Overholt[3] left the segmental surface open and allowed the lung to breathe "

Chamberlain and Klopstock[7] cautioned in regard to the dissection of the left upper lobe hilum noting that there was often an anomalous arterial supply to the anterior segment arising from the parent artery to the apical segment as described by Appleton[2] and Boyden[4] They pointed out that ligation of such vascular structures, before proper identification might lead to serious complications These investigators also clearly visualized the intersegmental veins as receiving tributaries from both sides of the intersegmental plane and advised careful dissection and preservation Chamberlain and Klopstock also suggested that it is a good general rule to delay the division of any vein until absolutely necessary "

Most of the experimental work in the pathogenesis of pulmonary infarction has dealt with embolization or ligation of the pulmonary arterial tree Although infarction of pulmonary tissue may occur in the presence of sudden occlusion of a large pulmonary artery in a healthy animal it is not the usual course of events[1] It is well established that any condition leading to the production of serious venous stasis predisposes to subsequent infarction of arterial origin

Ameuille and co workers were concerned with the character of collateral circulation developing in the presence of pulmonary venous ligation Only 4 of 10 dogs survived his intrathoracic procedure and these were sacrificed at intervals up to 7½ months after which injection studies revealed marked vascularization of the overlying pleural palque, opposite the operative site forming collateral venous channels Such a mechanism of venous return is absent in a nonexpanded isolated segment such as occurs in complicated segmental resection In 1936, Reinhoff[12] in describing a two stage technic of pneumonectomy for bronchogenic carcinoma referred briefly to the danger of inadvertently

ligating the superior or inferior pulmonary veins He suggested this could lead to moist gangrene He cited however no specific cases and did not speculate upon the pathogenesis Brantigan and Kent and Blades in discussing the anatomy of the pulmonary lobes implied that gangrene might result if the venous drainage of the related lobe was interrupted In 1948 Swan and Mulligan did experimental ligation of pulmonary veins in dogs Pathologic study revealed severe fibrinopurulent pleuritis with vascular adhesions intense hyperemia hemorrhage and edema of the alveoli and bronchioles and increased susceptibility to infection They noted thrombosis of the veins but did not observe extensive tissue necrosis They concluded that in spite of the initial congestion and alveolar hemorrhage the lung eventually recovered with approximately a 20 per cent decrease in functional capacity Perhaps in these experiments the rapidly developing vascular pleural plaques bridged the gap preventing acute lobar pulmonary venous insufficiency Wyatt and co workers conducted a similar canine study and noted the importance of antibiotics (penicillin) in preventing severe postoperative infection predisposing to infarction They were impressed with the extent and vascularity of the pleural plaque and commented upon its significance in establishing collateral circulation These investigators described small fibrous nodules scattered throughout the healed areas in the pulmonary lobe and speculated upon their pathogenesis without considering them healed infarcts

In 1951 Stemmermann Daniels and Auerbach ascribed the pathogenesis of bronchopleural fistual following excisional therapy for pulmonary tuberculosis to pre existence of disease in the pleural space at the time of surgery The resultant empyema spread to the bronchila stump with subsequent breakdown and fistulous formation In 1952 Zelman Davidson and Ulmar reviewed 200 cases of pulmonary tuberculosis submitted to surgical resection and found that necrosis of the lingula occurred in 1 case following segmental resection Steele Narodick and Cadden in 1953 remarked that the disadvantage in the performance of small resections for pulmonary tuberculosis was the high incidence of postoperative complications Although there was no mortality and the end results were good 20 per cent of patients developed persistent lung leaks hemothorax or empyema There were however no tuberculous complications In the presence of such leaks they advocated that it was better to perform a secondary thoracotomy than to persist in the prolonged use of drainage tubes Bell in 1955 discussed the postresection space complicating segmental and wedge resection He reported 61 complications in 308 resections an incidence of

20 per cent, and noted that the location of the persistent space was usually at the operative site In his experience, most localized pneumothoraces responded to underwater seal drainage within 2 weeks a small number, however, became chronic problems with pyogenic infection He concluded that the occurrence of such complications did not significantly influence the future status of the patient's tuberculosis Douglass, Bosworth, Judd, and Chang,[21] as all of us, had some experience with late leaks or pneumothoraces occurring 2 to 10 days after removal of intrapleural tubes They used the term "alveolo pleural fistula" and remarked that a distinction between this problem and broncho pleural fistula should be made Corpe Shek and Cope,[22] in 1956, reviewed 182 segmental resections performed for tuberculosis and noted that air leaks in the postoperative period accounted for more than half of the total number of complications Twenty two patients having pleural spaces required further therapy Of these, three developed bronchopleural fistulas, empyema subsequently developing in one Nine of the patients were treated by re insertion of pleural catheters and 12 by post excisional thoracoplasty Final results were considered to be excellent however, they were unable to make recommendations which might decrease the significant postoperative morbidity rate In 1955, Findlay[23] while a member of the Thoracic Surgery Staff at Fitzsimons Army Hospital became interested in our studies on postoperative pleural space problems and was convinced that postresection pulmonary infarction does occur and not infrequently, is the sole cause of the residual pleural air pocket which may persist and progress to other complications of a more serious nature if not promptly and properly treated In 1956, he reported that a persistent pleural space following partial resection of the lung may lead to bronchopleural fistula months later and advised early reoperation at which time the visceral pleura is not thickened with fibrosis and the lung is still expandable One of us (J M S) reported on some of our early experiences and opinions on "postoperative infarction of the lung" in the Eighth Annual Symposium on Pulmonary Diseases—Fitzsimons Army Hospital 1955

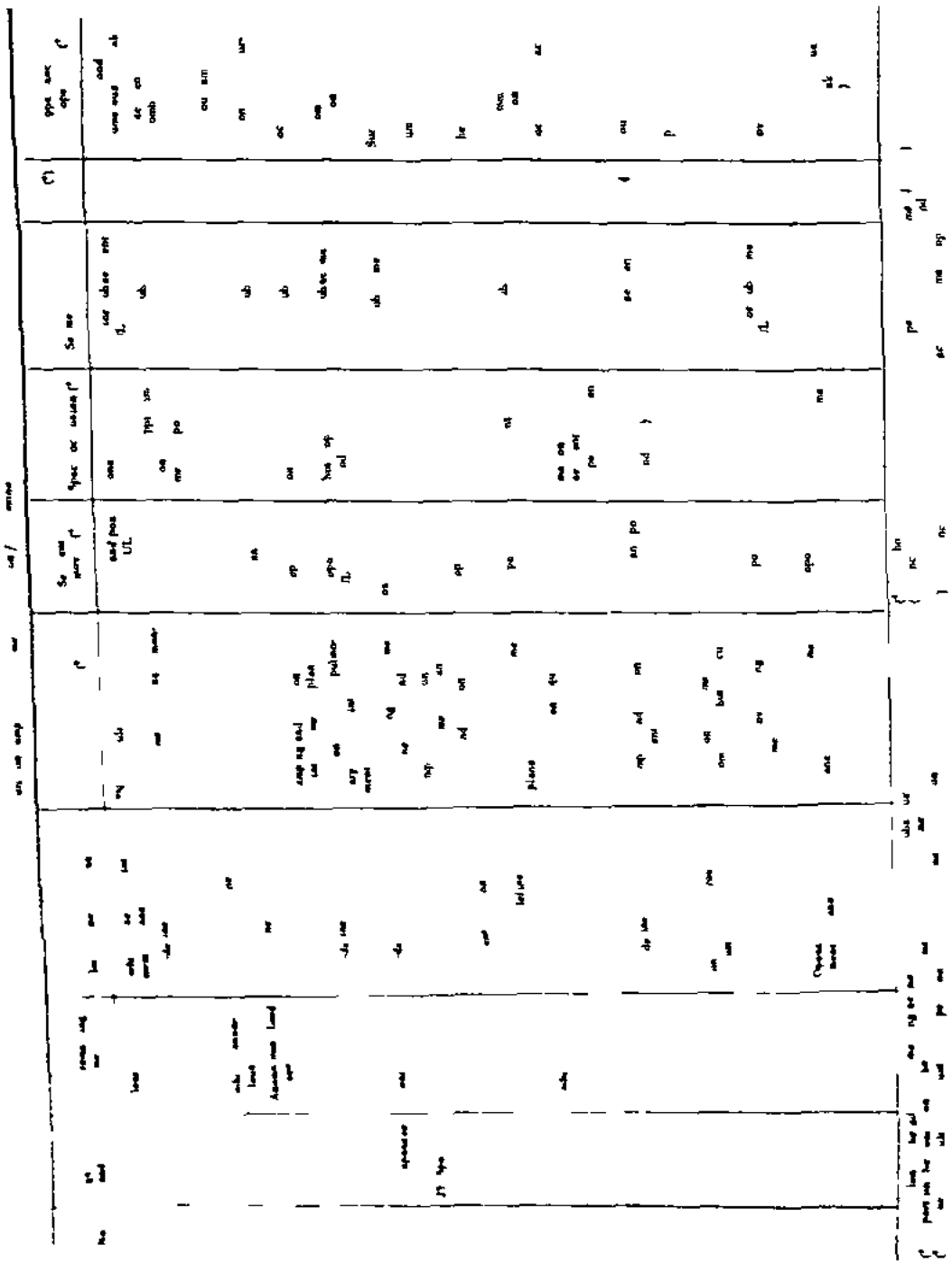
CLINICAL FEATURES AND OBSERVATIONS

The complication of pulmonary infarction following segmental resection for pulmonary tuberculosis occurred fifteen times in 400 procedures performed on 371 patients during the period of January 1954 to February 1958 This difficulty involved 7 males and 8 females with an average age of 28 years All except 3 were Caucasian The average duration of tuberculosis diagnosed prior to surgery was 1.4 months, the longest being 5 years and the shortest 7 months The period of chemotherapy prior to surgery

averaged 7 4 months the longest course being 15 months in 3 cases 6 months and in 1 only 1 month Chemotherapy primarily consisted of isoniazid para aminosalicylic acid and streptomycin in varying combinations The average duration of negative cul tures prior to surgery was 6 8 months the longest being 12 months and in 1 it was only 3 months One patient who had never shown positive cultures received 1 month of preoperative chemo therapy

The surgical description of the adjacent segments remaining at the conclusion of surgery revealed no palpable disease in 8 cases Five had a definite nodular fibrotic consistency to palpation and 2 upon dissection of the hilum revealed anomalous vessels In 9 there was either severe fibrosis obliterating normal tissue planes or nodular disease within the intersegmental plane In 1 case a small cavity was opened along the inter segmental plane and this was the patient who exhibited a late tuberculous pseudopulmonary cavity of the type described by Bell and Medlar Review of the operative reports revealed no technical difficulty in 9 cases although in these patients there was frequent mention of ligation of venous channels and over sewing of leaking segmental surfaces In the remaining 6 cases the dissection was described as difficult requiring sharp pro cedures and wedging across the intersegmental plane (see table 1)

Pathologically all specimens obtained at the first procedure revealed cavitary disease except four which consisted primarily of healing necrotic foci Two cavities were considered to be inspissated while three were reported as healed " In one there was histolo_ic evidence of progressive disease The tissue removed at the original procedure usually consisted of the apicoposterior segment of the upper lobe there being seven such procedures on the left and three apical and posterior segmentals on the right Of the remaining five two consisted of removal of only the posterior segment of the right upper lobe the posterior subsegment of the left upper lobe the apical segment of the right upper lobe and finally a left upper lobe equivalent. When pulmonary infarction complicated the segmental procedure it always occurred in a segment of which one segmental plane was involved in the dissection procedure Thus the anterior segment was the commonest such segment involved being adjacent and exposed in 10 procedures The three posterior segmental re ections sub equently involved subse_ments of the apical se_ ment The one case in which apical resection was performed in volved a ubse_ ent of the anterior segment and finally fol



In all cases the essential features leading to reoperation for presumptive infarction of an adjacent segment or subsegment consisted of a persistent air space usually apical or subtentorial (if pleural tent created) and overlying a triangular density with its broad base directed medially and often having a concave upper margin This apical air space occasionally showed a fluid level however none were successfully collapsed by needle or catheter aspiration Inordinate pain persisting beyond the immediate postoperative period was a noticeable feature in one third of the cases A sharp tearing pain in the affected region was sometimes reported These patients as compared with others seemed to bleed more profusely in the early postoperative period Three had hemothoraces treated by lytic agents (streptokinase streptodornase) prior to removal of intrapleural tubes after initial thoracotomy

The time which elapsed between initial segmental resection and reoperation averaged 17 6 days in 14 cases In half of the patients the second thoracotomy was performed in 9 to 14 days The longest interval of 144 days occurred in a patient whose initial postoperative course was considered essentially normal After being released to the Medical Service there developed a gradually enlarging apical subtentorial air space with the characteristic underlying triangular density Upon reoperation a tuberculous pleuropulmonary cavity was demonstrated this being the only case in which an active tuberculous lesion was proved at secondary thoracotomy The subsequent course has been uneventful

In regard to the first operative procedures pleural space obliterating procedures were performed in 10 cases of which 8 consisted of construction of a pleural tent and in 2 a modified thoracoplasty was performed In three cases partial obliteration of the pulmonary space created after segmental removal was accomplished by pleural margin approximation employing non suture cotton ligatures in two and interrupted sutures in one All patients except one received intrathoracic instillation of streptomycin and penicillin

At reoperation an apical or subtentorial air space was detected of varying dimensions having an average volume of 100 to 300 cc The average space diameter was 5 to 6 cm In all instances air leaks could be demonstrated over various areas of the infarcted tissue Upon stripping fibrinous material from the affected segment the latter characteristically did not bleed but bubbled diffusely and presented a firm woody or soft frankly necrotic texture to palpation Its color varied from purplish red to brownish black depending upon the stage and the extent of the necrosis In two cases there was a frank odor of gangrenous tissue

The extent of the infarction was variable It always involved some portion of the intersegmental surface and characteristically involved the most distal portion of the specimen sectioning revealed extension of varying distances into the underlying parenchyma In three cases there was complete infarction of the entire related segment When surgery was performed under three weeks, there was no great technical difficulty encountered in removing the infarcted segment or subsegment however there was an exception in one case as related below A fairly clear line of demarcation was usually visible between necrotic and viable lung Often peripherally the necrotic tissue could be wiped away with a gauze sponge or separated by blunt dissection The main difficulty in the dissection was encountered at the hilum where, because of close proximity of the pulmonary vessels and the severity of the necrotizing process, serious hemorrhage may ensue due in 1 of our cases to involvement of the wall of the pulmonary artery by the necrotic process However, the out come was entirely successful

Follow up studies for periods ranging from three months to four years have revealed no evidence of spread or reactivation in any and no complications attributable to the second thoracotomy Additional data pertaining to the 15 patients who had localized postresection infarction of the lung are listed in table 1

PATHOLOGY

Grossly the specimens were purplish black to brownish in color and had a variable consistency Most presented a firm indurated, noncrepitant texture but, in some cases the material was markedly soft and friable Thrombosis of surface veins buried in blood clot or fibrin along the intersegmental plane was frequently observed The pleural surface of each specimen was often partially covered by a fibrinous layer having a variable consistency depending upon the time which had elapsed since the previous surgery This layer was usually soft friable and yellowish white in color The superficial surface of this plaque was often firmer than the underlying surface where it was in apposition with the necrotic tissue

The cut surface of specimens usually revealed a dry finely granular purplish black appearance which was sharply demarcated from any comparatively normal lung that may have been included with the specimen In two specimens in which there was a distinct odor of gangrenous tissue central softening and liquefaction were observed Examination of the cut intersegmental surface often revealed thrombosed vascular structures leading into the necrotic lung

Microscopic examination of sections taken at right angles to the segmental surface revealed characteristic hemorrhagic infarction with focal necrosis of pulmonary tissue tending to become confluent at the surface The central portions of these lesions showed complete loss of cytologic detail including the nuclei of alveoloseptal cells In spite of such profound necrosis the tissue characteristically maintained its configuration with well defined acidophilic hyaline walls inclosing degenerating masses of conglutinated red blood cells Although occasionally the periphery of the infarcted area was well circumscribed by fibrous tissue (probably representing a sublobular fibrous tissue plane) it was more characteristic to find no such delimitation the zone between viable and nonviable tissue being remarkably free of either fibroblastic tissue or inflammatory cells Healing was evidenced by a feeble and ineffective organization of intra alveolar fibrin resulting in thick walled avascular nonfunctional alveoli

The contained vessels showed thrombo es and mural necrosis particularly noticeable in the superficial intersegmental veins Serial sections of the latter revealed proximal viability and luminal patency Spaces within necrotic tissue were often ob served this was believed to be histologic representation of the multiple alveolopleural fistulas so characteristic of these lesions

Three aspects of this material appeared particularly interesting to one of us (H N H) Elastic stains upon necrotic tissue showed a surprisingly intact architecture despite the profound necrosis and the prolonged interval following initial surgery The necrotic tissue tended to become hyalinized and except for two cases there was little evidence of actual lysis of tissue The second puzzling feature of these specimens consisted of a marked degree of endothelial proliferation and often luminal obliteration of related arterial structures These were often ob served in adjacent viable pulmonary tissue The endothelial proliferation might be interpreted on the basis of adjacent tu berculous disease however the presence of an organizing thrombus would tend to discount this possibility The final im pressive feature was the degree to which metaplastic bronchial squamous epithelium was disrupted and di persed among the peripheral layers of necrotic tissue

BACTERIOLOGY

It i not surprising that infection did occur in 3 of the 15 cases Such infections were confined to the infarcted egment sub segment or pleuropulmonary cavity In two cases (12 13 see table 1) there wa frank gangrenous tissue due presumably to a Vincent type infe tion although cultures were sterile The final

case (15) was the only one showing evidence of an active tuberculous process in tissue removed at the second thoracotomy The patient had a prolonged delay of 144 days before secondary thoracotomy and acid fast bacilli were demonstrated on smear and tissue stains in the wall of the cavity, however, cultures were negative In this instance, there was formation of a tuberculous pleuropulmonary cavity

CASE REPORTS

Three clinical cases which illustrate this postresection syndrome of localized pulmonary infarction are presented below The other 12 cases were rather uniformly similar to those here recorded thus, an accurate preoperative diagnosis was made in our last 8 patients

Case 2 A 35 year old white woman was admitted on 9 April 1954 with a diagnosis of pulmonary tuberculosis Numerous roentgenograms since 1951 revealed a nodular infiltrate confined to the area of the right upper lobe which was considered to have undergone no change However in February 1954 two routine gastric cultures were positive for acid fast bacilli Other laboratory studies and physical examination revealed nothing remarkable other than post tussic rales over the right upper chest Chemotherapy consisted of streptomycin and isoniazid On 22 October 1954 after 6 months of chemotherapy a right upper lobe apical segmental resection was performed for significant residual nodular disease restricted to this segment The created raw surfaces of the anterior and posterior segments were approximated at the pleural margin by four interrupted sutures Twelve days after initial surgery a thoracotomy was again performed because of a persistent air fluid space which had not responded to multiple thoracenteses (fig 1) The midpectoral subsegment of the anterior segment appeared to be infarcted having a dense rubbery consistency and the vessels along the segmental plane were thrombosed intermittently air bubbled from this surface The involved subsegment was removed without difficulty after which the raw segmental surfaces came into favorable apposition as the lung was expanded by the anesthesiologist the pulmonary remnant filled the hemithoracic space completely Two large tube pleural drains were connected to water seal bottles and suction instituted Subsequent recovery was uneventful and the patient has continued to do well (fig 2)

Pathologic examination of the first specimen revealed caseonodose tuberculosis The second specimen consisted of organizing hemorrhagic infarction of the anterior subsegment with nonspecific chronic pleuritis and pulmonary fibrosis

Case 5 This 35 year old white man was admitted on 18 April 1956 because of an expanding rather circumscribed lesion in the left upper lobe (fig 3) Skin tests PPD No 1 four plus histoplasmin and

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Figure 4 (case 4) Roentgenogram eight days after segmental resection The large lension apical pleural space is demonstrated Infa ction in ante to segment p oduced the tr angula dense shadou below the space

Figure 3 (case 5) Roentgenog am of chest p for to [illegible] of of ary tube calou lesion n ap co

Figur 6 (13) Roe tg nogr m of h t two nd e-h lf mo th after ond tho a l my a d com- comit t pp t g mod f d th a pla ty l ft man g ment f p t t f csi th anter gm t

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coccidioidin negative No positive smears or cultures for acid fast bacilli were obtained Streptomycin and isoniazid were started on 18 May 1956 and apicoposterior resection was performed 8 June The solitary lesion 2 2 cm in diameter proved to be a rather thick walled tuberculous cavity from which acid fast bacilli were isolated No concomitant collapse procedure was performed In the postoperative period the water seal suction bottles continued to bubble and an apical air space failed to improve (fig 4) He continued to complain of rather severe chest pain Ten days after segmental resection he was re turned to surgery and an infarction of a subsegment of the anterior segment from which air leaked freely was demonstrated and removed A modified thoracoplasty was performed and the patient has done well since

Case 13 A 42 year old white man noticed the onset of fatigue two years prior to admission A chest roentgenogram on 31 July 1956 revealed bilateral upper lobe cavitation The only early positive cul ture was obtained as the result of bronchial washings Chemotherapy was instituted on 8 August 1956 with 600 mg of isoniazid and para aminosalicylic acid 12 grams daily On 17 December the isoniazid was increased to 900 mg On 15 March 1957 a right thoracotomy was performed with removal of the apical and posterior segments A tent of the apical parietal pleura was performed and recovery was un eventful On 28 March 1957 sputum culture was again positive for acid fast bacilli and the isoniazid was increased to 1 500 mg with 1 gram of streptomycin daily On 10 July 1957 an apicoposterior re section of the left upper lobe was performed Postoperative x ray studies revealed well expanded lung with some cloudiness over the apex without discernible space On 14 July the intercostal tubes were removed However on 26 July 1957 (fig 5) an air space was observed at the apex and it was thought that this had resulted from an infarcted segment Air leak was continuous as demonstrated by needle aspi ration He complained of almost constant "sharp tearing" chest pain Twenty nine days following the initial left thoracotomy the left thoracic cavity was entered through the previous operative site pleural symphysis was observed over an extensive area and incomplete in farction of the anterior segment was seen which had advanced to the stage of gangrene in one area Small air leaks on the surface of this infarcted segment were observed and thrombosed vessels leading to the anterior segment were palpated and visualized Segmental resection of the infarcted segment was accomplished and a modified thoraco plasty was performed Subsequent course has been completely un complicated (fig 6) The pathologic specimen consisted of the anterior segment showing a large area of infarction (fig 7)

DISCUSSION

Pulmonary infarction complicating segmental resection, ac cording to our concepts is certainly not a new entity The char



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acteristic symptomatology has long been recognized, but the underlying pathogenesis has not Such terms as the "late space problem," alveolo pleural fistula,"[21] "masked broncho pleural fistula,"[27] "occult broncho pleural fistula"[21] have been offered in an effort to characterize this problem or its complications The salient clinical findings and basic diagnostic features are (1) a persistent tension air space in the region of the previous pulmonary resection, (2) no evidence of an overt bronchopleural fistula and (3) commonly demonstrated roentgenographically, below the pleural space, is a triangular density with its broad base directed medially and having a concave upper margin if no fluid is present, otherwise, a horizontal air fluid level

The complications which may accompany or follow such pul monary infarctions, if not corrected by early and proper surgical measures, are as follows (1) A persistent and nonresolving air space, provided the resulting pulmonary infarction is of significant depth and magnitude Such may negate the intended purpose of segmental resection, i e , the preservation of un involved and apparently normal functioning pulmonary segments thus, the space plus the fixed necrotizing and/or organizing segment will deter adjacent segments from expanding to full functional capacity (2) Bacterial infections—blood, serum, avascular tissue and the "dead space" provide an excellent culture media for bacterial growth the intermittent ingress of respired air via the porous necrotic segmental surface is a factor worthy of mention With due deference to antimicrobial agents, nevertheless we must assume that in due course of time, some untoward superimposed complication of a bacterial nature will ensue A listing of such possibilities is proposed as follows localized empyema, mixed empyema (pyogenic and tuberculous), tuberculous pseudopulmonary cavity adjacent specific or non specific pneumonitis contiguous tuberculous reactivation and/or distant spread putrid lung abscess (such has been observed in our experience on one occasion however, the exact nature of the pathogenesis was not determined) osteomyelitis of ribs, and chest wall infection (3) Frank and indisputable broncho pleural fistula (4) Massive fatal pulmonary hemorrhage—such has been reported in the literature following segmental and sub segmental resection

The prevention of this type of postoperative complication, i e localized pulmonary infarction, depends to a large degree upon maintaining the integrity and continued patency of the re maining branches of the intersegmental vein It is evident, when considering column 5 data in table 1 (Surgical difficulty), that the crux of the problem appears to be the surgically exposed surface venous channels, which, no doubt, play an important

role during the immediate po toperative healing phase It is noteworthy that the surgeons reported various types and degrees of difficulties in 1⁹ of the 15 patients during dissection in the interse_mental plane Thus many factors influence the post operative competence of the intersegmental pulmonary veins Some factors which immediately come to mind are active or fibrotic tuberculous residuals involving the interse_mental plane tuberculous nodules beyond the interse_mental boundary which are removed by additional wedge excision excessive bleeding from intersegmental plane requiring clamping ligatures and sutures excessive air leaks the control of which may also require clamping ligatures and sutures with possible inclusion of venous tributaries rare anomalous venous distributions and technical errors and difficulties It might be noted that nine surgeons performed the initial surgery on the 15 patients developing this complication two being staff surgeons and seven were residents on the thoracic surgery service—all being capable of operating independently or had staff surgeon assistance and upervision

An additional factor which seems to warrant consideration is the possible prophylactic value of the surgically created pleural tent We feel such a procedure may be of some value if the pulmonary surgical defect is relatively flat (not a deep wedge like defect) thus the pleural tent seems more commonly indicated after an upper lobectomy than following segmental resection The prevention of this postoperative complication may depend also upon the degree of early angioplasia and venous channels which form in the fibrinous plaque separating the remaining segment from the adjacent pleural space If there is rapid organization of this surface plaque then minimally infarcted zones will probably be effectively walled off and healing will take place On the other hand if early angioplasia and fibroblastic proliferation is poor the necrotic surface will continue to leak via multiple alveolopleural fistulas

This early fibrinous plaque covering the raw surface is uniformly demonstrated in the experimental animal as well as in patients having had pulmonary resections and is a major contributing reparative process which makes the technic of segmental resection possible This consideration should always be kept in mind by the surgeon who in some instances may elect to enhance this aspect of the surface healing process by performing a pleural tent or a limited modified upper stage thoracoplasty We have shown to our satisfaction on numerous occasions after performing pulmonary dissection technics on dogs that the rapidly forming fibrinous pleural plaques make it extremely difficult to produce alveolar air leaks of sufficient

duration to produce pleural air spaces, although we rather uniformly establish areas of subsegmental infarction by ligation of intersegmental veins [28]

CONCLUSIONS AND RECOMMENDATIONS

It seems superfluous to state that surgical skill, judgment, and experience are all important, nevertheless we are convinced that any thoracic surgeon regardless of experience and training, may from time to time be confronted with this postoperative complication Therefore, it seems imperative that all should keep this syndrome in mind when postresection space problems occur It is very questionable if it is proper to apply conservative methods of management such as multiple thoracenteses and re insertion of catheters and tubes for lengthy periods Most of our patients have been given the benefit of such methods of early management without any evidence of success Accordingly, it is proposed that if such methods fail in four to six days that secondary thoracotomy is in order Re inserted closed drainage tubes should not remain long enough to initiate or contribute to secondary infection It is our opinion that secondary thoracoplasty alone would be curative in only a small percentage of cases, however, such a procedure of the modified type or construction of an apical parietal pleural tent concomitantly with secondary thoracotomy will not infrequently be necessary

At this juncture of our incomplete understanding of this problem of postsegmental infarction of the lung we hesitate to make any concrete or dogmatic recommendations and proposals other than those related above Nevertheless a "scheme of surgical conduct" is offered which we believe is sound in principle and based upon our clinical experience and incompleted laboratory investigation of this problem to date [2]

Recommended Scheme of Surgical Conduct

1 Maintain integrity of branches of intersegmental vessels on surface of retained segment Segmental surface sutures and stitch sutures are kept to a minimum often surprisingly complete after complete filling of segment by the anesthesiologist meticulous dissection in the intersegmental plane is mandatory

2 Do not attempt suture infolding of raw surface

3 Do not attempt reconstitution of pulmonary defect by multiple layer sutures beginning in the depths of the defect such closure technique would favor intersegmental venous stasis thrombosis and infarction

4 Complete removal of segment by dissection may easily progress outside

leaving a nubbin of subsegment quite devoid of circulation although expansion may be surprisingly good

5 Perform upper lobectomy on the right in favor of apical and and posterior segmental resections planned i e if fibrosis and nodular disease are found to involve the apical and anterior intersegmental plane Pleural tent or limited modified thoraco plasty may seem indicated

6 A similar situation on the left as related in 5 above, with apicoposterior resection contemplated—if intersegmental fibrosis not overly extensive—suggest that anterior segment be retained and manage infarction of anterior segment by secondary thora cotomy if such should develop

7 Secondary thoracotomy in 10 to 14 days when there is clinical and roentgenographic evidence of postoperative pul monary infarction Surgical judgment will dictate if concomitant pleural tent or modified thoracoplasty should be performed

SUMMARY

series of 15 patients having incurred pulmonary subseg or segmental infarction following segmental resection tuberculosis in 400 consecutive procedures has been ana lyzed Clinical and roentgenographic features characterizing this postoperative complication are presented The proposed pathogenesis of demonstrated infarcted contiguous segments pathologic findings are discussed and recommendations e offered in regard to prevention Once frank pulmonary in farction occurs secondary thoracotomy in 10 to 14 days is recom mended All 15 patients having had secondary thoracotomy are without evidence of reactivation and doing well 3 months to 4 years after segmental resection The mortality to date in this series of 400 pulmonary segmental resections is 0 5 per cent 1 patient having died of cardiac arrest at completion of pulmonary resection and the other of pulmonary hemorrhage 6 weeks after upper lobectomy and superior segmental resection

REFERENCES

1 Sw et R H L bect my nd p umo my i h m f p lmo ary t b ! *J Thoracic Surg* 15 373 1946

2 A pl n, A B Segm d br h latur f h lung *Lan t* 2 592-594 1944

3 Ov h l R H Wood F M nd B R H An mp ed m hod f f p ! ry *J Thorac Surg* 17 464 1948

4 B yd E A Th trab lar d la ed gmen l an my f h lung *Surgery* 18 706 1945

5 Chur h ll E D nd B l y R Segm l pulmo ry i b h ct *Ann. Surg* 109 491 1939

6 Clag t O T d De l g R A J T h q f gm l p lm y e- w b p rtic l f l g l my *J Thorac Surg* 15 227 1946

7 Ch mbe l J M d Kl p ock R Furth p w h gme l e- l *J Thorac Surg* 20 843 1950

8 Body n E A. *Segmental Anatomy of the Lungs* McGraw-Hill Book C mp y Inc N w Yo k N Y 1955 Ch pt r 3 and 6.
9 Scha pfer K The ffect of lig ti n f th p lmo ary rt ry of on lung w tho t and with resect n of phr i n rve *Arch Surg* 13 623 1926.
10 Ol h, I V nd B ll u, H C Experiment l ab of lung foll wing ligatiot f pulmonary artery and i ci ion nd s ture of pulmonary p r nchyma *Arch Surg* 19 1586 1929
11 Ameuille P Lem ne J M nd N ill J Circul t rie p r les adhera c s a,r s ligature des ve nes pulm n ires *Ann. d anat path* 15 85 1938
12 Reinhoff W F Jr A two- tag op rat o for tot l p eumo ect my in th treat ment f carc noma of th lung d mon tr ting w t chnique for cl sure of the br nchu *J Tho acic Surg* 8 254 1938
13 Brantig n O C An malie f p lm ary v ns—the r urg c l signif cance *Surg Gynec & Obst* 84 653 1947
14 Ke t E M a d Bl d s B The surgical anatomy of the p lmon ry lobes *J Thoracic Surg* 12 18 1942 43
15 Swa H d M llig n R M E p rim tal st dy of the ff t of lig t n of p l mo ry v n i th dog *J Tho acic Surg* 17 44 1948
16 Wyatt J P Burk D R a d H olon C R Mo phol gy study f ani lung ft r l gat n f th pulm nary ns *Am. J Path* 29 291 1953
17 St mmermann G N Daniels C F and A tbach O Th p th ge es s of br n h pl ur l f t la f ll w ng excisio l thet py for p lmo ry tuberc l i *J Thoracic Surg* 22 392 1951
18 Zelman E D id o L R d Ulm r D 200 case of t b rc lo i with c ional surgery *Quart Bull Seaview H sp* 13 131 1952
19 St le J D N tod ck B G d Cadd A V The i fl e c of lo g-t rm hem th rapy n the surgery f p lm ry t b rcul sis *J Tho acic Surg* 26 459 1953
20 B ll J W M g m t of the p stre ct o p c n t b rc l s s foll w g egm tal d wedge r ect *J Tho cic Surg* 29 649 1955
21 D ugl ss R B worth E B J dd J M d Cha g K H Resect on urg ry t tube l s *J Th racic Surg* 29 136 1955
22 Corpe R F Shek J L d Cope J A An exp rim nt w th segmental re- s ct n n th t tm t of tub l s s *Dis Chest* 30 183 1956
23 Fi dl y C. W Jr Th ma g m nt f th pleur l sp ce following par s ctio f th lung (p i lly f r t ber lo i) *J Tho acic Surg* 31 601 1956
24 S ly r J M. The surg c l tr tm t f p lm n ry t b rc losis (with d scussion f som c mpli t o) E ghth Sympos um on Pulmo ry Dis s s 2 Part I Lecture No 9 1955
25 B ll J W d Medl r F M Th rol of chron occ lt postre ct on f t th r ct t n of t b ul i p thog i n d tr tm t *J Tho acic Surg* 32 779 1956
26 M scall L a d Kl pst ck R Th pleural tent *Am. Re T berc* 73 831 1956.
27 Fr B J nd Murphy J D The m k d br nch pleur l fistula *J Thoracic Surg* 29 512 1955
28 Mart G W Harr n H N and S ly r J M U p bli hed e per m nt l l bora t ry d t

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BUTCHERED AND MAULED BUT RUGGED

The English language is a marvelously supple tool responsive to artisan as well as to artist sometimes more expressive after having been inelegantly butchered usually at its worst in the mouths of pedagogues and salesmen and certainly a rugged system of symbol to withstand the maulings of all of us.—The Medical Spectator, On Disorders of Pen and



Clinicopathologic Conference

Walter Reed Army Hospital

Summary of Clinical History The patient was a 44 year old master sergeant with 16 years of military service. As a child he had an attack of scarlet fever which left him partially deaf in one ear. At the age of 16 he had a urinary tract infection which kept him in bed for 6 weeks and from which he recovered without residuals. Otherwise he had enjoyed good health until the onset of his present illness. Two years prior to the present admission a moderately severe bilateral flank pain developed that radiated into the scrotum and was definitely accentuated in the recumbent position. The patient also experienced nausea, anorexia and a 30 pound weight loss. A medical work up at a Veterans Administration hospital revealed no demonstrable lesion. On discharge from the Veterans Hospital the patient went to the Mayo Clinic. A mild hypertension and a left hydrocele were found. Excretory urogram, proctoscopic examination and lumbar myelograms were interpreted as normal. The Mayo Clinic advised laparotomy and the patient reported to Chanute Air Force Base.

First Hospitalization An exploratory operation was performed at Chanute Air Force Base on 1 April 1950. The surgeon described a retroperitoneal tumor mass which extended from the lower border of the pancreas to the bifurcation of the aorta, surrounding the great vessels. This mass was considered an inoperable malignancy and other than a biopsy no further surgical intervention was undertaken. Microscopic sections of the biopsy specimen however revealed only chronic inflammatory tissue. No abnormal bleeding was reported during or following this exploratory laparotomy. After an uneventful postoperative course the patient was transferred to the hospital on 9 May.

From the Walter Reed Army Hospital and the Army Medical Service Graduate School, Washington, D. C. Lieutenant Colonel, MC, USA, Chief of Medical Service, Walter Reed Army Hospital. Major, MC, USA, Assistant Chief of Medical Service, Walter Reed Army Hospital.

Second Hospitalization A left hydrocelectomy and a testicular biopsy were performed No tumor was found The postoperative course was complicated by bleeding into the scrotum with formation of a large hematoma Hematologic studies revealed a prolonged bleeding time, but despite thorough investigations no definite cause of this bleeding tendency could be established

It was again decided to explore the retroperitoneal space to establish a diagnosis Laparotomy on 27 July revealed the previously described hard retroperitoneal mass which was found to engulf the middle third of the left ureter Frozen and permanent sections of the biopsy material again revealed only chronic inflammation and fibrosis Increasing evidence of ureteral obstruction necessitated a left nephrectomy and ureterectomy, which were performed on 18 August 1955 The ureter was removed to the point where it disappeared into the tumor mass Examination of another biopsy specimen taken from the main tumor mass again revealed only chronic inflammation and fibrosis Following an uneventful recovery, the patient was discharged to duty

THIRD HOSPITALIZATION

After two symptom free months, the patient noted recurrence of back and flank pain He was treated with antibiotics for pyuria The pyuria cleared but the back pain remained Excretory urography was suggestive of a right ureteral calculus, and the patient was readmitted on 6 June 1956 for evaluation and therapy

Physical Examination The patient s temperature was 98 6 F, blood pressure, 150/96 mm Hg pulse rate, 72 He was slightly obese No lymphadenopathy was present Abdominal examination revealed no palpable organs or masses Rectal examination findings and the prostate were normal Neurologic examination findings were normal

Laboratory Studies Urinalysis was normal with a specific gravity of 1 004 The white blood cell count was 10 400 per μl with a normal differential Hemoglobin was 12 grams per 100 ml Blood urea nitrogen was 30 mg per 100 ml Bleeding time was 21 minutes Total serum protein was 4 9 grams (albumin 2 0, globulin 2 9) per 100 ml Repeated roentgenograms of the chest, gastrointestinal series barium enema and gallbladder series were normal

Course in Hospital After the bleeding time had returned to normal (on cortisone 100 mg daily), a cystoscopic examination and a right retrograde urogram were performed The ureter was dilated but there was no evidence of calculus The previous impression of calculus was ascribed to a kink in the ureter This retrograde study did show obstructive uropathy in the middle third of the right ureter A ureteral catheter was left in place On 27 June

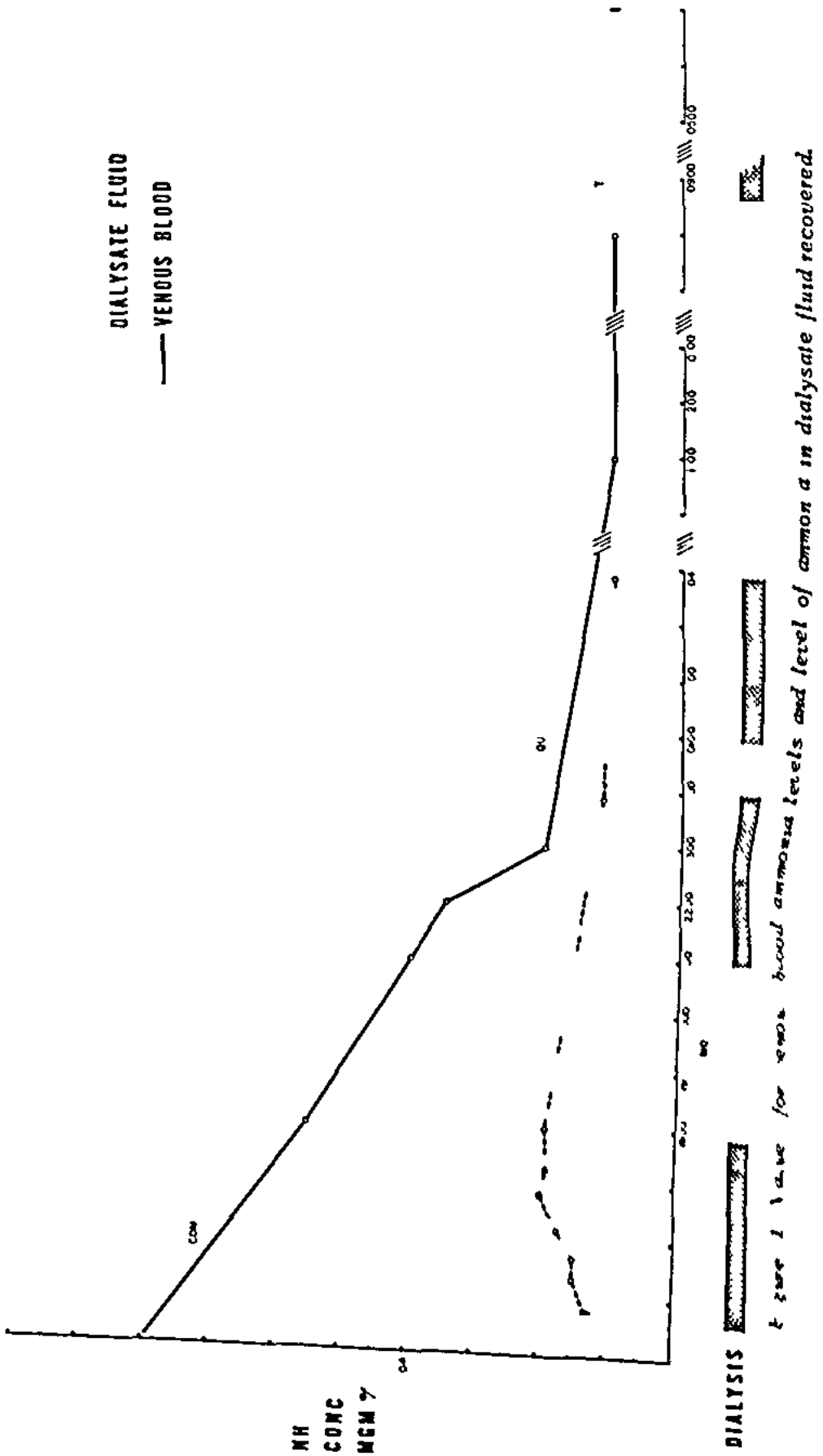
We have recently carried out peritoneal dialysis in a patient moribund from liver coma in order to determine its effect on the course of the disease and to see if the measured blood ammonia could be lowered by this method

CASE REPORT

A 60-[illegible]old woman was admitted to this hospital on 7 November [illegible] had been admitted to another hospital on 5 November [illegible] was in shock from massive bleeding from the gastrointestinal tract A two year history of known cirrhosis of the [illegible] liver was present She had felt relatively well on the morning of admission but later in the day vomited considerable blood [illegible] and was admitted to the hospital where her remained unconscious Despite successful treatment of bleeding and shock by [illegible] tamponade transfusion of whole blood and supportive treatment Venous blood ammonia was reported as 91 micrograms per 100 ml on 8 November

Physical examination on 7 November revealed an elderly jaundiced comatose man His temperature 101 F pulse rate 100 per minute blood pressure 120/58 mm Hg respirations 30 per minute deep and with frutty odor to the breath Several ecchymotic spots were present on both arms the head and the thorax Numerous spider nevi were present on the upper trunk and shoulders The liver was palpable 5 cm below the right costal margin There was a trace of pretibial pitting edema The fecal macroscopic examination on the right was flaccid and hypertonic of the right half of the body was noted

The admission white blood cell count was 4 100 per μl with a normal differential The hemoglobin was 12 0 grams per 100 ml and the hematocrit was 35 ml per 100 ml The latter values rose to normal levels following whole blood transfusion and remained within normal limits thereafter Urinalysis revealed a specific gravity of 1 026 an acid reaction and a trace of albumin and sugar Bile was present in the urine and there were one to three white blood cells per high-power field Repeated determinations of serum electrolytes including sodium potassium chlorides calcium and magnesium were within normal limits The carbon dioxide combining power averaged 30 mEq per liter on 8 and 9 November Total serum protein was 6 1 grams (albumin 2 4 grams globulin 3 7 grams) per 100 ml The serum bilirubin on 9 November was 11 mg per 100 ml and rose to 13 4 mg per 100 ml on 10 November The blood urea nitrogen values ranged from 23 to 39 mg per 100 ml Spinal fluid examination findings were normal The prothrombin time was 40 per cent of control values The serum activity on repeated testing was negative Culture of peritoneal dialysate fluid showed no growth Serial electrocardiograms showed some depression of the S-T segment in many leads a prolongation of the Q-T interval and [illegible] small low voltage Values for venous blood ammonia [illegible] and for ammonia in dialysate fluid recovered are expressed [illegible]



Case 1 Table for weekly blood ammonia levels and level of ammonia in dialysate fluid recovered.

On 8 Nov mber peritoneal lavage was carri d out bec u e there had been no improv ment in the patient s com tose state for the preceding 72 ho rs The procedure and the solutions used wer a previously r p rted by Hearn and Berry For each di lysis 1 000 ml each of a standard stock solution of normal saline 5 per cent dextrose in dis tilled water and 5 per cent dextrose in saline were used and modified as follows to each of these solutions (left in its original container) was add d 45 mEq of sodi m b carbonate 4 mEq of potassium chloride and 100 000 units of queous crystalline penicill n Ten ml of 10 per cent c lci m glucon te was given intra enously after each of the two dialyses t correct for calcium loss into the dialysate fluid The first dialysis was complet d at 1800 hours and the second at 2100 hours on 8 No ember Ne r the term nation of the second di lysis the pa tient s condition changed dr matically from a state of deep coma to the po nt where h opened his eyes raised h s head mo ed his ex tremities and spoke coherently Dialysis was not carried out on 9 No ember because he remained fairly luc d L ter in the day however he lapsed int part al com once more On 10 November he remai ed parti lly c matose but mo d his extremiti s o comm nd and respond ed to pai ful stimuli

The third d alysis w s ca ried o t during the afternoon of 10 No vember and the fourth during that evening Dur ng the night the patient once more mproved a wered simple questio s mo ed all extremities d attempted mple calcul tion with p rti l succes Around 0100 on 11 N emb r he ag in laps d into pr gress ve com and expired t 0 00 h urs

S gn fic nt g oss autopsy finding includ d pale-tan finely nod lar l ver wh ch on m c oscopic section showed evidence of portal cir rhosis an enlarged spleen e oph geal rices and erosion of the e ophageal m cosa 2 m from th es phagogastric junction Except for mild hyperemia of the serosal surface of the sm ll intestine there were no nu ual changes in the per toneal cavity in the immedi te v cinity of the indwelling polyethylene tube

COMMENT

There are three clinical situations in which ammonia intoxica tion is apt to occur (1) In far advanced liver disease without apparent precipitating influence such as hemorrhage into the gastrointestinal tract excess intake of protein or medication such as ammonium chloride (2) in liver disease associated with one of the latter precipitating factors (3) in cases of massive gastrointestinal hemorrhage associated with severe liver disease As pointed out by Riley and associates dialysis probably is not indicated in the first two instances cited above because in the patient with far advanced disease there are too many associated metabolic abnormalities and in the second instance merely withholding protein or offending medication from the diet might reverse the process The most commonly met clinical exam le of the third in tance is the cirrhotic patient with mas ve blee ing from the ga trointestinal tract

Such a person literally poisons himself with his own blood, because, as previously pointed out free blood in the lumen of the intestine is a potential source of ammonia His diseased liver is unable to cope with the increased load of ammonia carried to it by the portal vein, and the level of the blood rises If conventional measures fail to control the level of ammonia in the blood, the indication for hemodialysis probably exists

Interpretation of the results of hemodialysis in patients studied thus far has been difficult A number of investigators[3 8 10 11] point out that recovery from clinical symptoms often lags behind the time of maximal lowering of blood ammonia values and cannot be correlated precisely with the degree of consciousness Najarian, Harper, and McCorkle[7] suggested that this delay may be related to the fact that there also is an apparent lag in the change in the concentration of the cerebrospinal fluid ammonia level as compared to the level in the blood, and that level of consciousness is more nearly related to the former than to the latter Exactly how ammonia is related to the degree of consciousness is not precisely known This problem has been discussed recently by a number of authors [12–14]

Our clinical impression in this case was that there was a direct relation between the falling level of ammonia in the blood and the return to near normal level of consciousness in the patient incident to the application of peritoneal dialysis It appears to us that peritoneal dialysis is an effective means for the removal of ammonia from the blood It may prove a useful procedure in those instances in which the indication for hemodialysis exists and the artificial kidney is unavailable or is contraindicated

AIR FORCE OFFICERS NAMED KEY CHAIRMEN FOR 1959 MEETING OF MILITARY SURGEONS

Two Air Force Medical Serv ce officers assigned recently to im portant new duties have been named the key chairmen of the sixty sixth nnual meeting of the Association of Mil tary Surgeons by Brigadier General Harold H Twitchell USAF (MC) surgeon of U S Air Force in Europe president of the society The meet ng will be held at the M yflower Hotel Washington D C November 9 10 a d 11 1959

Col nel Aubrey L Jennings USAF (MC) surgeon of Headquarters Command U S Air Force s nce 1954 nd comm der of the new hos pital at And ews Air Force Base will be g neral chairman of th meeting He was r cently named chief professional consultant to the Air Force Surgeon G neral Colo el Frank M Townsend USAF (MC) the new director of the Armed Forces Institute of Pathology is chair man of the scientif c program c mmittee Formerly deputy direct r he ucceeded C ptain William M S lliphant MC USN on 1 August and is the first A r Force officer to hold this po ition Captain Silliphant w ll retire on 1 September after more than 29 years of naval ser ice



Col J mn g



C lon l Town d

G l Tw t h ll h s des gnated Pract ce of Military Medicine— B o d g C pts the them for th 1959 meet ng and has un d th org n z t on of th follow g committees

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LETTERMAN HOSPITAL COMMANDER

Brigadier General Achilles L. Tynes [illegible] man Army Hospital San Francisco [illegible] received the silver stars of his new rank [illegible] He formerly was commanding officer of the [illegible] Dix New Jersey



A native of Virginia General Tynes was graduated from the University of Virginia Medical School in 1930 and was commissioned in the Army Medical Corps the same year. After completing postgraduate studies at Mayo Clinic in 1939 he was assigned to Walter Reed Army Hospital. In 1941 he became an assistant in hospital construction planning for the Army surgeon general where he assisted in the planning and construction of the hospital program for World War II. He also supervised planning for construction and modification of the fleet of 29 hospital ships—an achievement for which he received the Legion of Merit.

General Tynes assumed command of Letterman Army Hospital and supervised construction of the present hospital. He was the surgeon general's office in 1947 as chief of the [illegible] and planning branch and in 1949, became head of the [illegible] and operations division. From 1951 to 1952, General Tynes was the U. S. Army Hospital [illegible] to the Far East Command.

CAPT MARSHALL NAVY VETERAN, RETIRES

C ptain Leslie B Marsh ll MC USN (Ret) who was appointed editor of the United States Navy *Med cal News L tte* on 4 August 1950 and held the position longer than h s six pr decessors combined reverted to r tired status on 30 June after com pleting more than 42 years of n al service For the past year he also has been chief f the publications divisi n in the Bureau of Medic ne and Surgery



C pt Mar b ll

A medical veteran of both world wars Capt in M shall was graduated from the Uni versity of Tennessee College of Medicine in 1917 He ser ed aboard the U S S *N vada* and *Nokom s* du ing World War I and later on the U S S *Relief Black Hawk* and *Houston* In 1939 and 1940 he was in Peiping Ch na with the U S Mar ne Corps nd n September 1941 wa sent to London as a speci l n l observer prior to the Un ted States entry into the w r During and following th war he comm nded large Na y hosp t l n No man Oklahoma H uston and Camp W llace Texas P rris Island nd Be ufo t South Carol na and on G am His col rful career lso included assignments as medic l officer of the Se enth and Fifte nth N v l Districts in J cksonville Florid and Balbo C nal Zone

Capta n M rsh ll was tr n ferred to the retired list on 1 July 1953 but rem i ed on ctive duty as editor of the *Medical Ne s L tter* His successor in the Bure u of Medicine a d Surgery i Captain Don ld R Childs MC USN formerly on the medic l staff of U S Naval Hospital Ph ladelphi

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SYMPOSIUM IN AVIATION CARDIOLOGY

An Internati nal Sympos um on Cardiology in A tion co- ponsor d by A r pace Medical Associati Airli Medic l Dir ctors Associ t o d the U S Air Force School of Aviatio Med c ne will be h ld 12 13 N mbe 1959 at Br ks Air Force Base Texas Those d r ng to tt d h ld wr te Dr L wrence F L mb chi f Depart me t of I l M d c U S A r Force School of Aviation Med cine B ok A F e B T

COLONEL MAXWELL NAMED ARMY MSC CHIEF

Colonel Roy D Maxwell MSC USA assistant for nuclear warfare instruction and casualty studies at the Army Medical Service School Brooke Army Medical Center Fort Sam Houston Texas since January 1957 became chief of the Army Medical Service Corps on 1 July 1959 He succeeds Colonel Bernard Aabel MSC USA who has been assigned to the Army Medical Information and Intel ligence Agency Arlington Virginia



Colonel Maxwell

An authority on nuclear radi ation and radiation fall out Colonel Maxwell served as radiological safety officer in the atomic bomb tests at Bikini in 1946 and has attended many nuclear and thermonuclear tests in the Pacific area and at the New Mexico proving grounds where he was chief of the fall out group in the Armed Forces Special Weapons Project at Sandia Base New Mexico He also has served as chief of the depart ment of biophysics at the Army Medical Service Graduate School Washington D C and director of the physiology and pharmacology division at the School

A native of Oklahoma City Oklahoma Colonel Maxwell was graduated from Oklahoma City University in 1930 and received M S and Ph D degrees in organic chemistry from the State University of Iowa in 1931 and 1933 respectively He entered the United States Army Reserve as a second lieutenant 4 November 1935 and was commissioned as a major in the Regular Army Pharmacy Corps 29 July 1946 On 4 April 1947 he transferred to the Medical Service Corps He graduated from the Command and General Staff School in 1945

AEROSPACE MEDICAL COURSE PLANNED

An advanced course in aerospace medicine for senior medical officers of allied nations will be held in September 1959 at the U S Air Force School of Aviation Medicine Randolph Air Force Base Texas as part of the Air Force support of the military assistance program

ARMY SG NAMES VOEGTLY EXECUTIVE OFFICER



C l V gtly

Colonel John H Voegtly MC USA executive officer at Walter Reed Army Hospital since 1956 was appointed recently to a simi lar position as executive officer to the Army surgeon general He relieves Colonel Bryan C T Fenton MC USA who has been assigned as command ng officer of M rtin Army Hosp tal Fort Benning Georgi

A 1937 graduate of the Uni versity of Pittsburgh School of Medicine Colonel Voegtly began his Army career in 1938 after an internship at Walter Reed Army Hospital During World War II he served as planning officer in the office of the chief surgeon European Theater of Oper tions He was assigned to the office of the Army surgeon general from 1945 to 1948 and following a three-year residency in internal med cine at Walter Reed Army Hospital wa assigned in 1951 as plans and operations officer in the medical section of the Seventh Army in Germ ny Pr or to hi as gnm nt s executiv officer at Walter Reed Colonel Voegtly was ch ef of the Departm nt of Atomic Casualties Studies at Walter Reed Army Medical Center for a year He was gradu ted from the Army War College in 1955 His decoratio s nclude the Leg on of M rit

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OFFICIAL DECORATIONS

The following awards were announced recently by the Depart ments of the Army and Air Force

Legion of Merit

Dr yt L T umb II Col USAF (DC)

Army Commendation Ribbon with Metal Pendant

S ip J L C l MC USA

Arthur F Str dberg Cap MC USAR

Air Force Commendation Medal

Al L Buch b m Ca USAF (MSC)

Ar h A H ffman Col USAF (MC)

Cl d Curr C l USAF (MSC)

D ld E S m Cap USAF (MSC)

DEATHS

DURHAM Wilson Ervin Captain AFRes (MC) of Muskogee Oklahoma assigned to 809th Medical Group MacDill Air Force Base Florida graduated in 1957 from University of Oklahoma School of Medicine Oklahoma City Okla appointed a first lieutenant in the United States Air Force Reserve on 15 June 1957 reported for active duty 9 August 1958 died 14 May 1959 aged 26 at Tamp Fla. of a gunshot wound

GAUNT Robert Lancaster Majo MSC USAR of Nashville Tennessee assigned to Army Medical Service School Brooke Army Medical Center Fort S m Houston Texa served in enlisted status 18 January 1941 to 18 January 1946 graduated in 1949 from YMCA Night Law School Nashville Ten appointed a captain in the Army of the United States 25 April 1949 reported for active duty 24 Apr l 1956 died 17 June 1959 aged 42 San Antonio Texas of my cardial infarction

KNIGHT Leon Arthur Lieutenant Colonel USAF (MC) of North Hollywood Califomia last ass gned to 1071st M dical Service Sq Fort Myer Virg nia with duty station at Reed College Portland Oregon gradu ted in 1944 from College of Medical Evangalists Loma Linda Los Angeles Calif appointed a c ptain in the United States Air Force Re erve on 13 October 1952 reported for active duty 29 December 1952 commissioned a major in the United Stat s Air Fo ce 15 M rch 1955 retired for physical disabil ty on 16 February 1959 died 5 May 1959 aged 43 at Veteran Admini trat on Hospital Los Ang les of adenocarcinom

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FIRST ARMED FORCES ORTHOPEDIC SEMINAR

Three distinguished orthopedic surgeons Dr Harold A Sofield of Oak Park Illinois Dr Joseph S Barr of Boston and Dr Frank E Stinchfield of New York City will be guest speakers at the Navy sponsored first annual Armed Forces Orthopedic Seminar 23 25 Sep tember at the U S Naval Hospital Oakland California Dr Don O Donaghue Oklahoma City will present a symposium and discussion on knee injuries Orthopedic surgeons and residents on active duty and members of the northern chapter of the Western Orthopedic Associ ation are invited to attend

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MAJOR BERRY IS ADVISOR FOR NEW TV PROGRAM

Major Charles A Berry USAF (MC) under orders to report in September to the office of the Air Force Surgeon General as chief of the aircrew effecti eness branch of the new division of aviation medicine is now in Hollywood California serving as technical advisor for a new dramatic television program entitled Space The new program will star actor Bill Lundigan as the lead character an Air Force of ficer and is scheduled to begin on CBS TV in September Major Berry has been chief of the department of flight medicine at the U S Air Force School of Aviation Medicine Randolph Air Force Base Texas for the past three years

Officers Certified by Specialty Boards

The surgeons general of the military medical services have announced that the following regular Medical and Dental Corps officers have been certified by the boards indicated

American Board of Neurological Surgery

S l rn l W lli m l Jr Cap USAF

Turp W lli m R M j USAF

American Board of Obstetrics and Gynecology

A J m A. M j USA
B k M ill ML M j USA
P rr J m P L Col USA
Sam J me E L C l USA

S pl P lh m P J M j USAF
V P lt J m Y Jr Lt C l USAF
W tf ll Charl H P M j USA

American Board of Ophthalmology

Cl k R d ll L C p USAF

H yn C d S C pt USAF

American Board of Oral Surgery

k h m F k H Lt Col USAF

American Board of Pathology

Ch mbl St rt A. J C p USA

Pathologic Anatomy

Hartl y L w J C pt USAF

American Board of Periodontology

Amb J m A. M j USAF
D t mo R b rt J M j USAF

S m b F l J M j USAF

American Board of Preventive Medicine

Public Health

B m M b l D Col USA
D l R w ll G L Col USA
M k w t l d Lt Col USA

P M rtl G Capt USA
W l Willl m J Lt C l USA

Aviation Medicine

B H rry R M j USAF
Cl J ph J M j USAF

H w rth Wallac G Cap USAF
H l tr m Fr t M G M j USAF

American Board of Radiology

G f k l Burt C pt USA

American Board of Surgery

Dom y Dal E C pt USA

T sl E t H Car USAF

Thoracic Surgery

J man W on C L Col USA

Progress Notes

Captain **Robert J T Joy** MC, USA a 1954 graduate of the Yale University School of Medicine was awarded the Hoff Medal during graduation ceremonies for the Sixth Military Medicine and Allied Sciences Course at Walter Reed Army Institute of Research in June The medal is given annually to the student with the highest class proficiency The second edition of *Management of Oral Disease* by Colonel **Joseph L Bernier** DC USA was recently published by C V Mosby Company St Louis The author is chief of oral and dental pathology, Armed Forces Institute of Pathology and a 1932 graduate of the University of Illinois College of Dentistry

Rear Admiral **Alfred R Harris** DC USN retired 1 June after more than 35 years of active service Entering military service in 1917 as an Army flying cadet he was commissioned a lieutenant (j g) in the U S Navy Dental Corps in 1924 after receiving his dental degree from the University of Nebraska Prior to his retirement Admiral Harris was district dental officer Ninth Naval District Captain **Edwin O Seiser** DC USN also retired 1 June leaving the Navy after more than 21 years of active duty He was senior dental officer at the U S Naval Auxiliary Air Station Kingsville Texas Colonel **Robert H Blount** USAF (MC) deputy commander of the USAF School of Aviation Medicine Randolph Air Force Base Texas supervised the presentation of a research exhibit at the static display shown by the U S Armed Forces during the 23rd International Air Show at LeBourget Airport Paris France

Captain **Edmund E Jeansonne** Captains **Donald E Cooksey** **Louis S Hansen** and **Robert A Middleton** and Commander **Gilbert H Larson II** DC USN all from the U S Naval Dental School Bethesda participated recently in the 76th annual meeting of the Maryland State Dental Association in Baltimore Colonel **John A Booth** USAF (MC) recently assumed command of the 6045th USAF Hospital Osan Korea succeeding Colonel **James K Gray** USAF (MC) who was reassigned to Stewart Air Force Base New York Colonel Booth was formerly Fourteenth Air Force surgeon Robins Air Force Base Georgia

Commander **Donald M Honeywell** MSC USN has been named as executive officer of the Hospital Corps School U S Naval Hospital Great Lakes Illinois succeeding Commander **Joseph W Collins** MSC USN who retired 1 July after 40 years of active service Commander Honeywell was attached to the U S Naval Hospital Bremerton Washington prior to this assignment

Captain **James A English** DC USN head of the medicine and dentistry branch Office of Naval Research spoke on The Dental Research Program—Review and Projection at the 15th meeting of the committee on naval medical research Division of Medical Sciences National Academy of Sciences—National Research Council in

Washington D C on 5 June Colonel William A Hamrick MSC USA w s reassigned in June from the Army Medical Service School Fort Sam Houston Texas to become executive officer for Major General James P Coo ey surgeon U S Army Europe Capt in John W Albrittain MC USN reported recently as head of the Medic l Corp Training Section Train ng Branch Bureau of Medicine and Surgery He was formerly at the U S Naval Hospit l Bethesda

Rear Admiral James R Fulton MC USN district medical officer Fourth Naval D strict Philadelphia retired 15 June after 34 years active service The following Navy Medical Corps officers were placed on the retired list as of 1 July Captains B njamin Ahl Nav l Air Facility Monterey California O Henry Alex nder Naval Shipyard Ch rleston South Carolina William C Baty Jr Headquarters U S Marine Corps Washington Carr E Be tol Naval D spensary San Francisco William L Berkley Naval Hosp tal Camp Lejeune North Carolina Ralph E Fi ldi g Thirteenth Naval District Seattle Jack R G orge Naval Training C nter S n Di go J hn N C Gordon U S Naval Academy Ann pol s Maryland John H L Heintzelman Physical Evaluation Board Potomac Ri er Naval Comm nd Leroy L Kenney Naval Hospital Charleston South Carolina Herman M Mo vetty Nav l Amphibious Base Coron do Califor a Lester E McDon ld Naval Av ation Medic l Center Pensacol Flor da Robert S Simpso Nav l Stat o Tongue Point Oregon Paul E Spa gler Physical Evaluation Board Twelfth N v l District San Francisco Guy E St hr Secretary Naval Review Bo rd Washington William P Stephens Naval Hosp tal Annapolis Charles B Stringfellow Physical Evaluation Board Fifth Naval District Norfolk Virginia John R Weisser Na al Ammunition Depot Hawthorne Nevada Otto W Wick strom Nav l Hosp tal Memph s Tennessee Milto R Wirthlin Ele enth Naval District San Diego Oscar D Yarbrough Naval Hospital Bethesda Carl K You gkin Fourteenth Naval District Pearl Harbor Honolulu and Thomas J C rter Camp Pendleton Californi

Mode Med cal Monog aphs is offeri g a prize of $500 in a compe t tion for unpublished manuscripts on clinical subject in the field of internal medicine by physicians under 40 years of age Authors of top-ranking manuscripts suitable for publication will be offered con- tr cts for publication in book form Manuscripts must be submitted by registered mail before 1 October 1959 to Richard H O r M D 33 Fast 68th Str et New York 21 N Y Captain George C Burkl y MC USN uceeded Captain R lph K Hoch MC USN as comm nd ng off e U S Naval Dispens ry W shingto D C on 22 June Capt t in H ch ha been app ted as a perm nent med cal member of the N y Phy ical Evalu t on Bo rd Potomac Ri er Nav l Command W h gto D C

Th U S A Force f d c l Serv ce e h b t Sp ce Medicine Re- h w w td d a rt f c t of me t as th best e hib t in the t o m l y med t h Am a Med c l Assoc tion s

1959 meeting This is the second consecutive year that an Air Force medical exhibit has won this award Before reporting to his new duty station as commanding officer of the Dental Detachment Marine Corps Recruit Depot Parris Island, South Carolina Captain **William M Fowler** DC USN presented two table clinics before the American Dental Society of Europe in Stockholm Sweden 8 and 9 July Dr **Oglesby Paul** clinical associate professor of medicine at the University of Illinois has been appointed as consultant in internal medicine to the medical staff at the U S Naval Hospital, Great Lakes, Illinois

Colonel **Carl G Giesecke** MC USA is the new commanding officer of the Medical Training Center Brooke Army Medical Center Texas succeeding Colonel **Edward Sigerfoos** MC USA who will become surgeon of the Eighth U S Army in Korea Colonel Giesecke has been deputy surgeon of the Fourth U S Army for the past year The American Society of Anesthesiologists recently appointed Commander **Thomas C Deas** MC USN chairman of its committee on defense and military affairs He is the chief of the anesthesiology service U S Naval Hospital Philadelphia Colonel **Joseph T Caples** MC USA has been named commanding officer of the U S Army Hospital and post surgeon at Fort Leavenworth Kansas He replaces Colonel **Joseph P Russell** MC USA who has retired after more than 27 years of active service

Captain **Arthur R Frechette** DC USN has relieved Captain **Bernard H Faubion** DC USN as deputy chief of the dental division Bureau of Medicine and Surgery Captain Faubion assumes duties as fleet and force dental officer Commander in Chief Pacific Fleet Captain Frechette was succeeded as head of the professional branch of the dental division by Captain **William R Stanmeyer** DC USN Colonel **John W Raulston** MC USA is the new commanding officer 24th Evacuation Hospital 67th Medical Group He succeeds Lieutenant Colonel **Lloyd R Stropes** MC USA who has been assigned to Fourth Army Headquarters Fort Sam Houston Texas Commander **Mary C Grimes** NC USN recently reported as head of the Nurse Corps Reserve Liaison Branch Nursing Division Bureau of Medicine and Surgery She was formerly chief of nursing service at the U S Naval Hospital Annapolis Maryland

Colonel **Conn L Milburn Jr** MC USA surgeon of the Military District of Washington for the past year has recently been appointed executive officer of Walter Reed Army Hospital Lieutenant Commander **Forbes H Smith** MSC USN has assumed his new duties as head of the internal review section in the fiscal systems branch Comptroller Division Bureau of Medicine and Surgery He was formerly attached to the School of Hospital Administration National Naval Medical Center

A Message From the A M A

This month s message concerns the seventh National Medical Civil Defense Conference in Atlantic City on 6 June 1959 The Conference is sponsored annually by the Council on National Defense of the American Medical Association and was presented this year by the United States Army Medical Service

In welcoming the 297 participants from 41 states the District of Columbia Hawaii and Canada Louis M Orr M D then A M A president elect told the audience that as members of the health and medical professions we individually and collectively have a tremendous role and responsibility in civil defense affairs

Physicians and allied medical personnel attending the meeting received a summary one day version of the Army s one week education and training program dealing with mass casualty concepts and treatment technics For a number of years these courses have been conducted at the Army Medical Service School Brooke Army Medical Center Fort Sam Houston Texas and at Walter Reed Army Institute of Research Walter Reed Army Medical Center Washington D C The general methods of instruction for these courses already attended by 6 000 students both military personnel and civilians include lectures student participation through practical exercises group and panel discussions visual aids and demonstrations with manikins The course embraces both short and long term expected injuries Counter medical and health measures are stressed to combat the nuclear effects of blast burn and radiation injury both from the preventive and curative standpoint

Major General Leonard D Heaton The Surgeon General United States Army in introducing the Army Medical Service program recalled his own experience at Pearl Harbor when we were suddenly faced with many hundreds of casualties on that fateful Sunday morning General Heaton pointed out that the management of multiple casualties requires first of all a plan based on experience and knowledge

The speakers and their subjects were Major Jack C Fitzpatrick MC USA Casualty Estimation and Analysis Lt Colonel Vincent I Hack MSC USA who presented a casualty demonstration Lt Colonel Joseph D Goldstein MC USA First Aid—Survival Care Colonel Theodore M Carow MC USA The Emergency Medical Packet for 100 Casualties Lt Colonel

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From the Council on National Defense of the American Medical Association The message is presented monthly by the Department of Defense —*Editor*

H Haskell Ziperman, MC, USA, Sorting and Establishment of Priorities," Lt Colonel Edward H Vogel, MC, USA, "Manage ment of Burns Resulting from Nuclear Disaster," Lt Colonel William H Moncrief, Jr , MC, USA, "Management of Soft Tissue Trauma," Colonel Philip R Beckjord, MC, USA, "Public Health Aspects of Preventive Medicine in Disaster " Colonel William D Tigertt, MC, USA, Chemical and Biological Warfare " Colonel Roy D Maxwell, MSC, USA, "Impact of Radioactive Fallout on Medical Operations " and Colonel Albert J Glass, MC, USA, Psychological Aspects of Disaster "

Members of the Army Medical Service, aware of the impli cations of nuclear warfare and cognizant of other serious threats from newer weapons, have made significant advances in many fields of emergency medical service Using the experience of past wars the results of research in the proper management of traumatic wounds, and the special clinical observations of patients in Army hospitals, there have evolved some fresh surgi cal approaches to old complex problems With the development of larger weapons and greater casualty producing devices and agents, there have been significant, though perhaps less dra matic, medical advances that appear to hold promise of reducing death and disability on the battlefield Old ideas have been enlarged to newer wider concepts of action For example, first aid is not merely what is done until the medical officer or medi cal corpsman arrives, but now includes the immediate appli cation of these lifesaving and sustaining measures that each soldier must do for himself, or for his buddy, until medical aid arrives Sorting is not the casual screening of patients by the admitting officer of the hospital, but an operative policy ac cepted by all medical officers at all times in the handling of casualties during mass casualty care operations New dimensions in the treatment of burns shock, hemorrhage, and traumatic in juries will make possible the saving of more lives and limbs with fewer medically trained personnel than was formerly be lieved possible With adequate training and management medical and other troops will be able to face biological, chemical and radiological attack including radioactive fallout, with equal fortitude with which they have encountered other hazards in the past Emotional and psychologic aspects of disaster, even when seen in large numbers of persons should not be considered as hopeless problems, but they should be realistically handled as they are amenable to well defined patterns of action

The American Medical Association and its Council on National Defense are most appreciative for the provocative, stimulating, and informative program which was prepared and by the United States Army Medical Service

In this issue

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Peritoneal Dialysis

Human Behavior in Groups

The Foot in Standing and Walking

Traction Device for Cervical Fracture

Pathologic Implication of Catechol Amines

Pulmonary Infarction and Segmental Resection

SERVICE ARTICLES ☆ REVIEWS OF NEW BOOKS

CLINICOPATHOLOGIC CONFERENCE ☆ CASE REPORTS



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September 1959 NUMBER

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EXCHANGES

Exchange of publications may be sent desired medical and scientific journals Communications on this subject should be addressed to the Editor *United States Armed Forces Medical Journal* Armed Forces Medical Publications Agency 7303d and Georgia Street NW Washington 25 D C

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Current List of Medical Literature
(World Health Organization) Monthly listing of articles published monthly cumulated and semiannually

Quarterly Cumulative Index Medicus
(American Medical Association) Author and subject

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(See inside of back cover)

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UNITED STATES ARMED FORCES
MEDICAL JOURNAL

Volume X September 1959 Number 9

EFFECTS OF IONIZING RADIATION ON HUMAN PSYCHOMOTOR SKILLS

ROBERT B PAYNE *Li ute a t Colo el USAF (MSC)*

THE realization of nuclear propulsion for manned aircraft depends in part on the availability of knowledge about the effects of low level ionizing radiation upon the psychologic capabilities of those who will fly and maintain them For obvious reasons the satisfaction of this requirement can at best be little more than approximated through lower animal research On the other hand ethical and moral considerations inherent in our culture preclude the development of such knowledge as a primary objective of human experimentation Thus the problem of how to obtain relevant and reliable information has been most vexing

A partial solution to this problem was offered six years ago by the director and staff of the M D Anderson Hospital and Tumor Clinic of Houston Texas [1] This group had long been interested in the comparative value of radiotherapy and chemotherapy for generalized neoplastic disease and it foresaw no valid criticism of an incidental and collateral study of behavioral changes if any that might arise subsequent to the routine application of radiotherapy All parties realized of course that the scientific orderliness of such a study and the applicability of its results might be somewhat diluted by the necessity for placing responsibility for selection of patients and prescription of doses entirely in medical hands Nevertheless the studies which finally resulted from this unique arrangement

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From the Department of Psychology U S Air Force School of Aviation Medicine Randolph AFB Texas Report 59-29 Col Payne's work was performed under USAF Aeromedical Laboratory ARDC 731 Seventh Street

proved reasonably sound These are reported here because of their useful implications for the Air Force and because they constitute the only known body of human data on this subject The clinical aspects of the radiotherapy studies were published previously

Two sets of observations will be reported The first set is concerned with the question whether a given air dose will have a greater effect when delivered in a single exposure than when delivered in a series of fractional exposures while the second can be considered analogous to a straightforward dose response study involving relatively high exposure levels If the results seem trivial now one should recall that no hindsight was possible in years ago when studies were begun

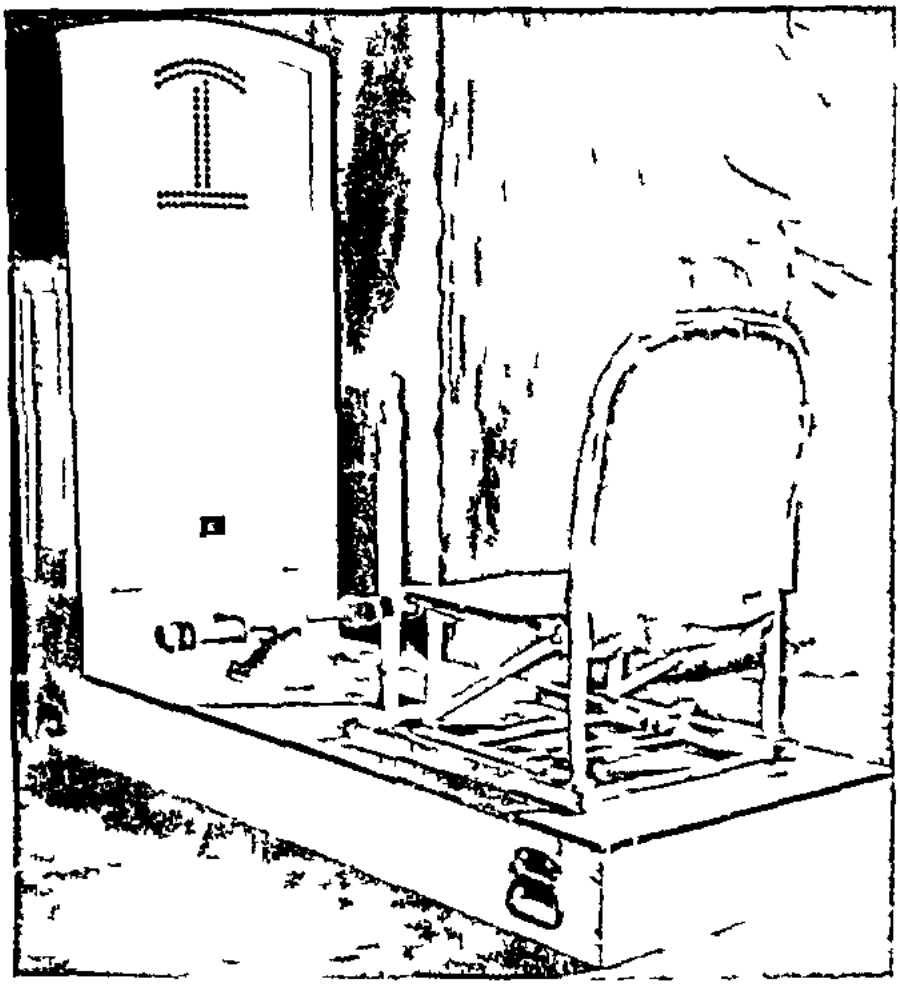
FIRST STUDY

The first study was organized around the therapeutic circumstance that some patients were treated with whole body dose delivered in single exposure while others were given equivalent total exposure in five equal increments separated by intervals of 4 hours Psychomotor performance data obtained from both types of patients made it possible to test hypotheses about the ways in which exposure effects become modified by temporal distribution

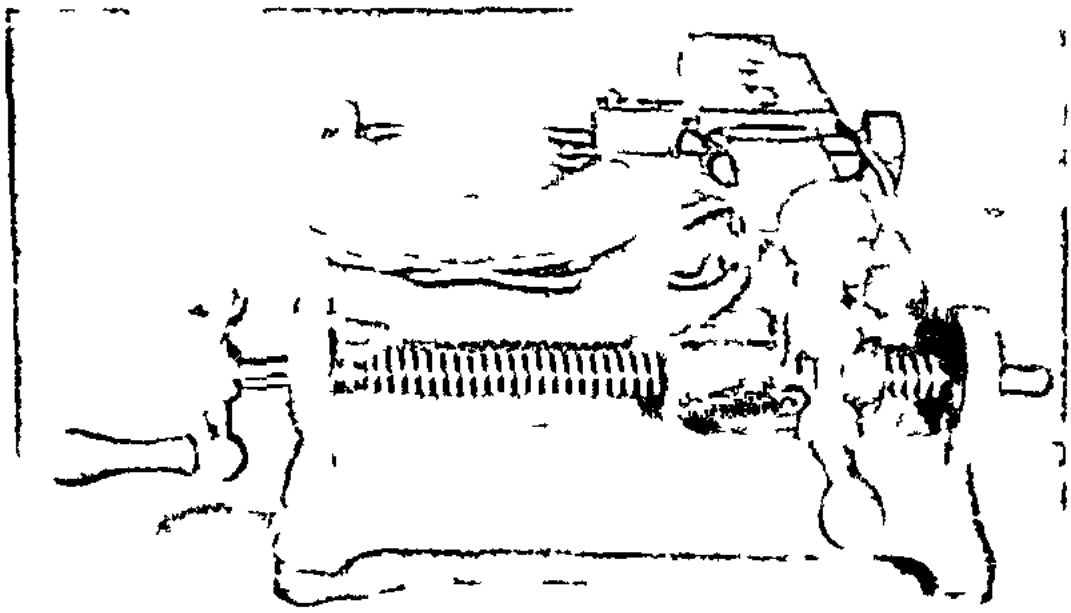
Subjects were male adults usually in advanced stages of neoplastic disease that was not amenable to surgical intervention who utilized radiation therapy Their ages ranged from 19 to years

Three well known perceptual motor tasks served as criteria of treatment effect The USAF School of Aviation Medicine (USAFSAM) complex coordination test (fig 1) required the subject to coordinate the movements of a stick and rudder bar in order to maintain successive positions of three red lights with three green lights The USAFSAM two-hand coordination test (fig) required the subject to turn two lathe like crank handles in order to keep a cursor positioned on an eccentrically moving target The USAFSAM rotary pursuit test (fig 3) required the subject to keep a small metal target within a slightly

The [illegible] were available for study [illegible] and [illegible] at the position of a plane light directly [illegible] whole body single exposure or [illegible] exposures [illegible] an interval of four [illegible] was [illegible] 400 kv Picker electric [illegible] with [illegible] filtration having a half value layer [illegible] The [illegible] focus to target distance of [illegible] One [illegible] field [illegible] was [illegible] in a lateral position with



Figu e 1 De ce used in the USAF SAM complex coo dinat on t st



I g De ce sed in the USAF SAM t o-hand coord at on test.

left and right sides alternated in proximity to the target Air wall ionization chambers (Farmer) were placed on the patient s s in during exposure in order to measure entrance and exit doses

Procedure At about 0800 hours on the day of exposure each subject was given formal test instructions and a standardized amount of preliminary practice on the three testing devices Practice sessions were 2 minutes for the complex coordination and two hand coordination tests and 100 seconds (five 20 second trials separated by 10-second rests) for the rotary pursuit test Following practice the prescribed treatments were begun One

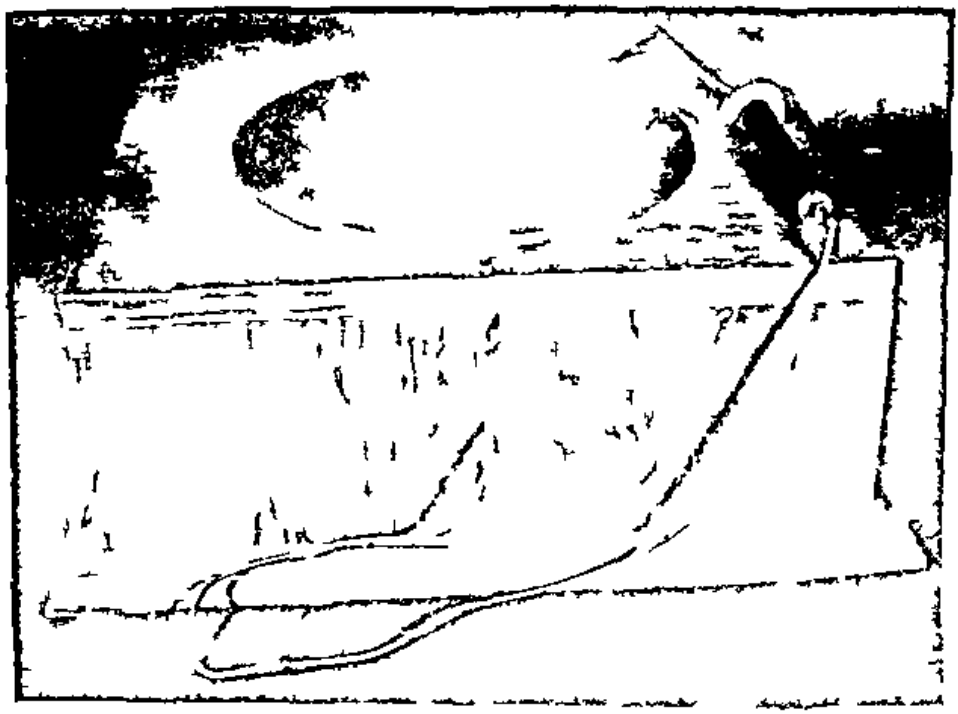


Fig 3 D d th USAF SAM Typ II I

hour later the psychomotor testing sessions were resumed and they were repeated thereafter at 2 hour intervals until six post treatment sessions had been completed Two testing sessions 8 hours apart were completed on the day following treatment Additional testing was done on some of the subjects but these data are not considered in the present study Single exposure subjects and multiple exposure subjects within a given total exposure group were treated alike except that the latter alternated between testing sessions and fractional treatment sessions until the five exposures had been accomplished

Results Indexes of two somewhat related dimensions of performance were subjected to statistical analysis The first index was simply the total score achieved during the posttreatment testing session or during any portion thereof that seemed worthy

of closer scrutiny The second index consisted of the tangent of the angle defined by the abscissa of the performance curve and the linear regression of scores upon abscissa values (trials) This was a measure of the linear component of learning rate Whenever appropriate, each index was adjusted for multiple regression upon chronologic age and pretreatment performance levels before the final analysis of the posttreatment variation was performed This had the general effect of (1) reducing the contribution of these factors and of factors correlated with them (such as type and severity of disease) to posttreatment variation and (2) increasing the precision with which final tests of significance could be made What remained for the final analysis was the variation attributable to the main experimental effects their interaction and the residual differences between subjects

TABLE 1 *Analysis of adjusted variance of overall achievement levels*

Source	df	Complex coordination		Two-hand coordination		Rotary pursuit	
		σ^2	F	σ^2	F	σ^2	F
Doses	2	827	<1 00	5 491	<1 00	256 38	<1 00
Method	1	477	<1 00	124	<1 00	1 85	<1 00
D × M	2	737	<1 00	13 087	1 07	148 68	<1 00
Error	70	2 538		12 234		1 285 82	
Total	75						

Reduced by 2 df for regression of performance (y) on posttreatment time (x) (2) chronological age (3) Rorschach and control values

For complex coordination $b_1 = 1.498$ and $b_2 = .0271$ Ry = .78 rx = .34 rxy = .39 ry = .76 For two-hand coordination $b_1 = 1.031$ and $b_2 = 3.7732$ Ry = .83 rx = .33 ry = .50 rxy = .79 For rotary pursuit $b_1 = 1.1944$ and $b_2 = 1.6493$ Ry = .74 rx = .16 ry = .47 ry = .74

The analysis of complex coordination test results given in Table 1 shows clearly that treatment levels and treatment methods do not contribute significantly either singly or jointly to the total adjusted variation The negligible main effects and their uncorrelated status are easily appreciated in figure 1 which shows the adjusted mean scores for each combination of treatment level and treatment method Comparable analyses were run for each posttreatment trial separately and for the linear component of the regression of scores upon the eight trial sequence but without significant results

The results of the two hand coordination test resemble closely those of the previous test As shown in figure 2 neither the

these results do not necessarily provide complete grounds for complacency for it must be recalled that our subjects although human were seriously diseased at the time of study And it must also be recalled that psychomotor coordination is only one of many processes which underlie aircrew job proficiency

SECOND STUDY

During the course of the medical staffs evaluation of the therapeutic value of whole body x irradiation it was deemed clinically sound to prescribe single doses higher than those which prevailed during the period of the first study As a consequence psychomotor studies were performed after the administration *of single doses as high as 200 r and for a longer period of time*

TABLE 2 *Analysis of variance of the trial for trypsin*

Source	df	Mean square	F	P
Dose	2	6 1888	<1 00	
Method	1	20 9941	2 05	165
Dose × Method	2	28 6785	2 79	075
Error	70	10 2589		
Total	75			

Reduced by 2 df for missing observations (y) prediction equation

Ry = 43 = 16 y = 42 rxy = 11 b = 0043 b = 0900

As before subjects were adult males whose participation in the study was governed by the medical staff as previously described Ages ranged from 23 to 76 years The psychomotor tasks were the same as those described in the previous study

As before patients were exposed in a lateral position with left and right sides alternated in proximity to the target For approximately half the subjects mostly those receiving below 75 r the treatment was delivered as previously described For the remainder treatment was accomplished by a General Electric Maxitron operated at 250 kvp with a Thoraeus III filter providing half value layer equivalent to about 3 mm of copper Output was about 3 8 r min Nine exposure levels ranging from 0 through 200 r in 5 r steps were sampled Each subject received his prescribed exposure in a single session

Procedure Beginning at approximately 0800 hours each day for 4 days prior to exposure each subject was allowed a practice session on each testing device Practice sessions both before and after exposure were 4 minutes for complex coordination and

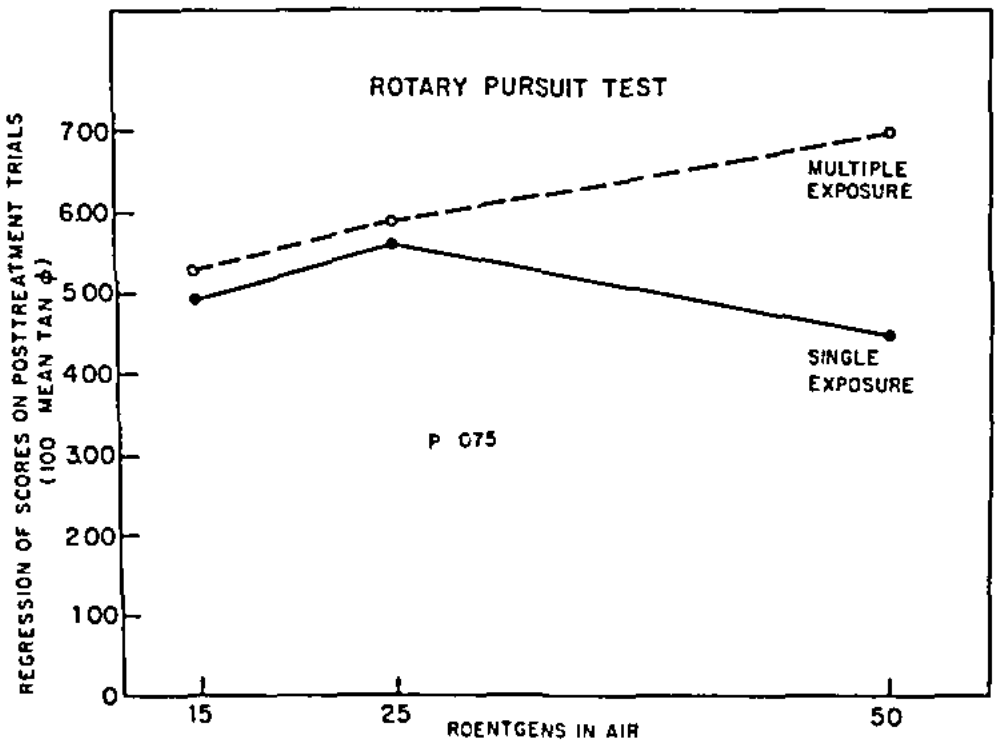


Figure 7 I te action of exposu e level and exposure method fo rotary pursu t

two hand coordination, and 300 seconds (fifteen 20 seconds trials separated by 10 second rests) for rotary pursuit Exposure occurred on the morning of the fifth day One hour later the first posttreatment testing session was held, and this was repeated each day at approximately the same time for 9 days thereafter All subjects including controls were treated essentially alike except for the amount of radiation to which they were exposed

TABLE 3 *A aly of a a c of adj t d po tt eatment a b c ment le l fo rotary pu u t*

S rce	df	Mean qu	F	P
Gro p (do)	7	23 086	<1 00	
S tre ted 1 k	57	40 466		
D y	9	75 218	(8 07	< 001
D × G	(3	1 229	1 11	ns
S D	513	1 105		
Tri ls d y		16 353	19 17	< 001
T × C	14	1 039	1 2	ns
Su T	114	853		
T D	18	121	<1 00	
T D × C	1 6	2 2	1 14	s
S T D	1 07(	38		
Tot l	1 949			

R d ced by 60 f f t t gt s c ll c ent f ll w S tre 1 k (2) S D (18) Se T (4) and S T × D (36).

Results Analyses of variation in posttreatment achievement levels for complex coordination and two hand coordination were based on the forty 1 minute performance samples obtained from each subject (10 days × 4 min /day) while that for rotary pursuit was based on the thirty 100 second performance samples from each subject (10 days × 300/sec /day) The scores of all subjects in each performance sample were adjusted for their multiple regression on chronologic age and pretreatment levels and the residual variation of all scores was then analyzed

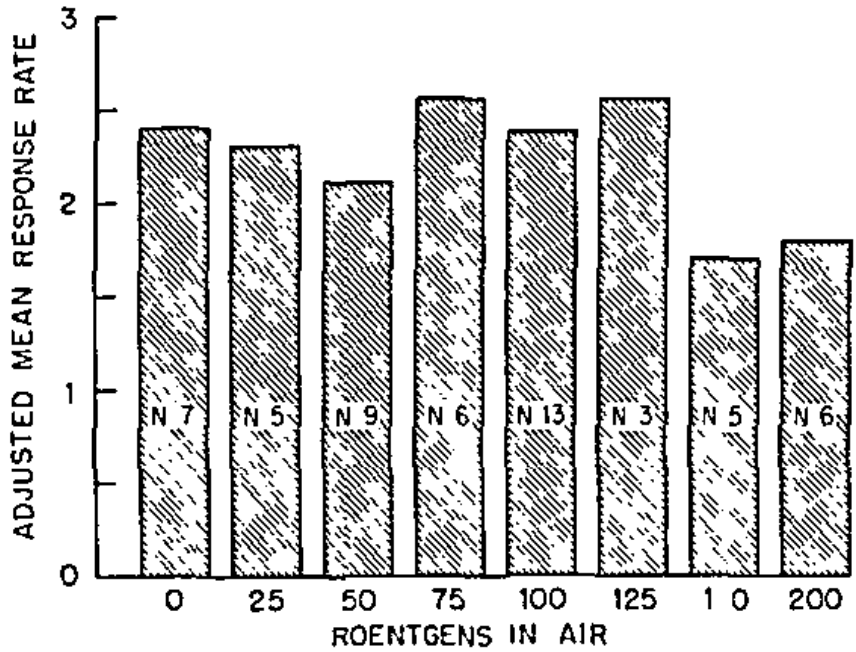
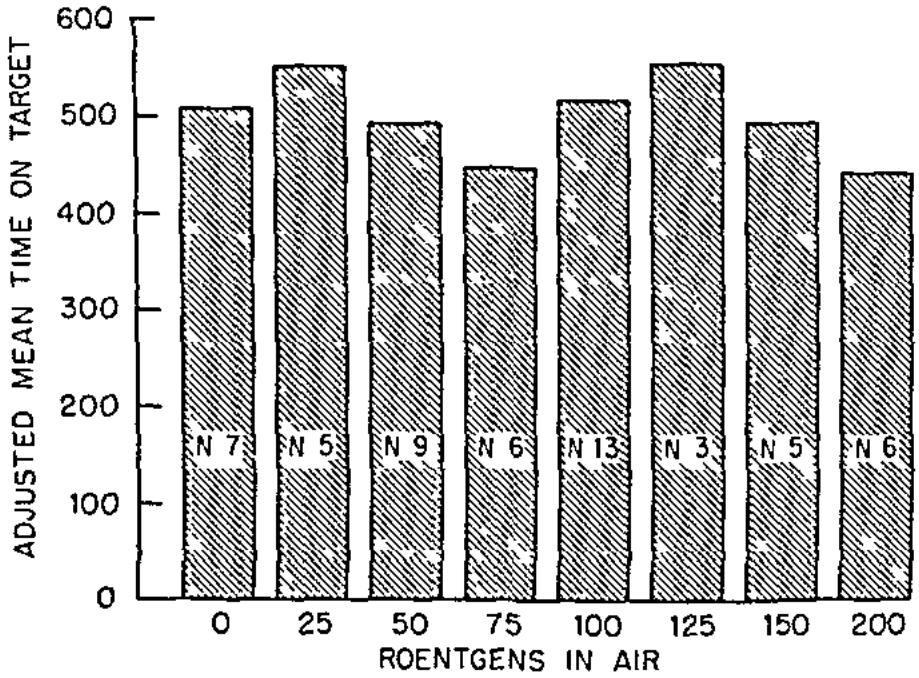


Figure 8 Dose function for complex coordination

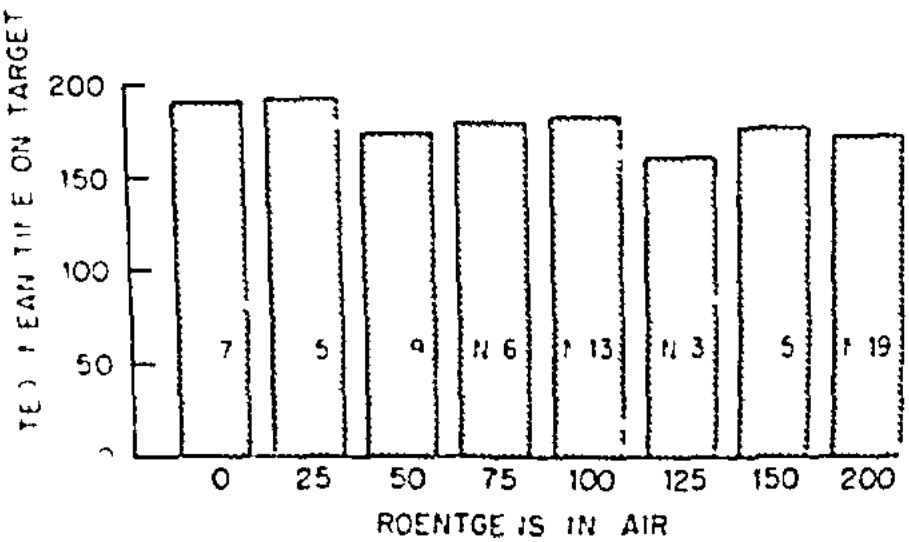
The outcomes for all testing devices are fully exemplified by the analysis of adjusted variation for rotary pursuit as shown in table 3 The highly significant variation attributable to days and trials/day results from the fact that significant amounts of learning occurred both within each day and from day to day All radiation groups are essentially alike in this respect as shown by the interaction values and there is no evidence of radiation impairment The radiation group means for the entire posttreatment sequence are shown for complex coordination (fig 8) two hand coordination (fig 9) and for rotary pursuit (fig 10)

The data from each testing device were further analyzed in terms of the linear component of the regression of scores on posttreatment trials both within days and from day to day but none of these analyses implicated radiation exposure as a significant source of variation Comparable analyses were made in terms of the quadratic component of these regressions that is



Figu e 9 Do e response function fo two hand coo dinat on.

a regression coefficient was computed for each subject then the total variation of the coefficients was partitioned with respect to between groups" and within groups sources in order to provide a test of significance of exposure effect The results of these analyses were negative for two hand coordination and rotary pursuit, but those for complex coordination were positive as shown in table 4 A plot of the mean quadratic coefficients against exposure values (fig 11) suggests despite the several inversions that the quadratic component of performance over the 10 day period becomes more negative the more intense the



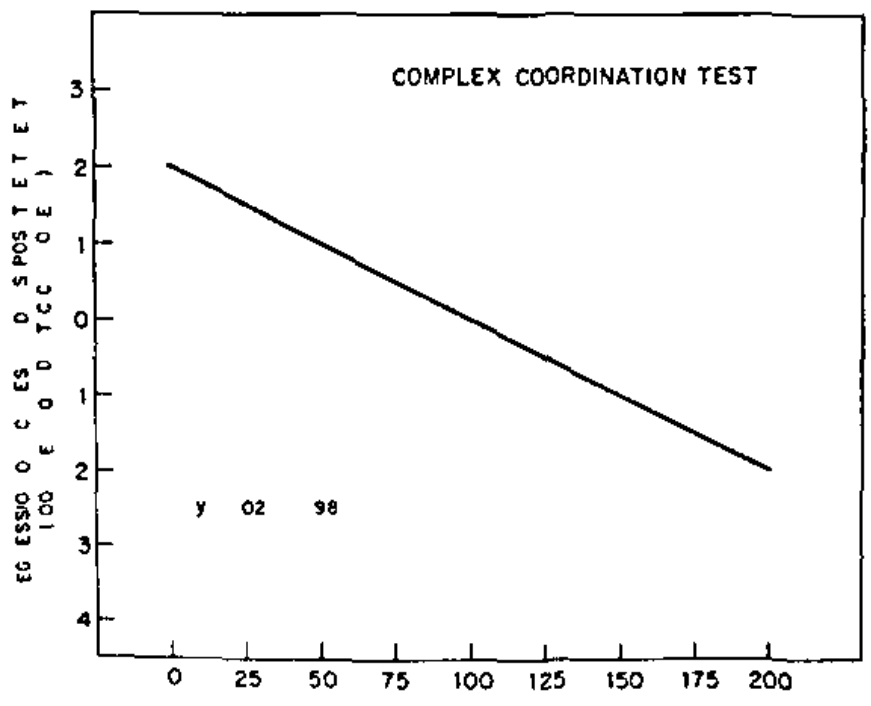
F g e 10 Doseres o se funct on for rotary purs t.

radiation exposure Another way of putting this is to say that the more intense the exposure the more likely it is that performance will be falling rather than rising toward the end of the 10 day period of measurement

TABLE 4 A ly f vari nc f quad t mp t f by d y f mpl d at

Sour	df	M an qu	F	P
B w en ad tion gr p	8	00282061	3 33	< 01
W th g p	58	00084699		
T l	66			

Discussion With the possible exception of the quadratic component of the 10 day performance sequence there is no evidence that exposure to ionizing radiation has affected the psychomotor skills in question Whether this exception is a true radiation effect is debatable It could just as well have been a disease effect for we must presume that the prescribed exposure intensity bore some relationship to the severity of the disease This confoundment of course was unavoidable What we may have in this analysis of the curvature aspect of performance sequence is some combination of radiation effect and



F gur 11 Change quad t comp f p forman q fun t f p l l

the general debilitating effect of the disease In any event, the absolute magnitude of change from group to group seems too slight to be of any practical significance

One further point requires clarification The radiation variable in these analyses was expressed in terms of air dosimetry because the more urgent objective of the studies was some empiric basis for deciding what behavioral risks might be invited by exposure to various possible radiation fields However, what the subject was exposed to and what he actually absorbed are not necessarily identical, the latter being a complex function of backscatter, the size and weight of the body, and the absorption coefficient of the various tissues If one computes an integral body dose more representative of the quantity actually absorbed it turns out on the average to be a linear function of the air dose Thus, it is clear that an air dose index would misclassify very few subjects with respect to the quantity absorbed This would suggest that our results would remain unchanged if analyzed in terms of integral body dose Checks performed thus far show that this is in fact the case

Finally it seems important to re emphasize that the application of these results to developmental and operational problems should be made with cautious regard for the medical status of the subjects we studied and for the limited relevance of experimental criteria

ACKNOWLEDGMENT Th writer gratfully ackowledges ndebtedn to Docto s R Lee Cl rk Gilbert H Fletche John F Dill Clifton D How Stella Booth Lowell S Mill r Warr n K S cl r and fessr Jo ph E Rooney and Arthur Col of the M D A d r on Hosp tal nd Tumor Cl nic and to Colonel John L P ck ng Dr Herbe t B Ge st and Capt in Edwin W Moore of th U S Ai F r e Scho l of A i tion Med ci e for their parti c pation n the prof on l and t h cal a pects of the studi reported h r

REFERENCES

1 G r t r H B A t r d ti yndr m m l tary d l d f p *U S Armed f o c* M J 9 313 354 Mar 1958 l U S A F r School f A ti M d R port 58-6 N 195
2 M ll L S Fl h G H d Cer t H B Sy t m d l l ff ct d d 63 p t ty wh le-body rr di w th m l do s f 15 t 200 U S A For School f A t Med i e R port 57 9 M y 1957
3 S l W K d Col A T h d d in try f r wh le-body rr di t o f p t U S A r S hool f A y Med i R port 57 70 M 1957

A good conscience is to the soul what health is to the body it preserves a constant ease and serenity within u and more than counterv ils all the calamities and af fl ctions that can possibly befall us —Joseph Addison

IMPROVED PHONETICS IN ARTIFICIAL DENTURE CONSTRUCTION

LESLIE R ALLEN *L t t C l l USAF (DC)*

LANDO aptly stated that the three major factors in complete denture construction are mechanics esthetics and phonetics Considerable progress has been made in the last few decades in improving mechanics and esthetics but little has been done to improve phonetics Neglect of this major factor in denture construction may be attributed to the fact that most edentulous patients tend to return to normal speech after a post insertion practice period of several days to several weeks Various kinds of oral inaccuracies occur during this practice period but by far the most common as well a the most difficult to overcome is the mispronunciation of the *s* n l *sh* While faulty speech is tolerated as part of getting used to the artificial denture it causes embarrassment to the patient and adds to his burden of physiologic adaptation to the denture

In the Air Force faulty speech is not to be tolerated when it concerns the flyer or control tower operator because failure to speak distinctly over the communication system could result in danger for both aircraft and crew Flyers and control operators are not immune to dental disease and some of them lose a sufficient number of teeth to warrant replacement In the prosthetic treatment for this group phonetics becomes an acute problem Therefore the objective of the present investigation was to develop a procedure in artificial denture construction which would enable the patient to speak clearly at the time of insertion of the denture

The literature in dental prosthetics was reviewed and previous method for improving phonetics were evaluated Snow after observing many casts of the natural dentition pointed out *that a tracing which started at the vault and passed over the* lingual alveolar area to the incisal edge of the maxillar incisor always formed a reverse curve He recommended thickening and contouring the area lingual to the collars of the maxillary incisor of the artificial denture in order to reproduce this re

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F m R h D ry D U S A F Sch l f A M d
R d Iph A F B T R p rt 59-10 C l All w s d 6160 h
U S A For H p l APO 9 9 S F C l f

verse curve, and he maintained that this reproduction facilitated the pronunciation of the *s* and *sh* Landa used the labiodentals (*f* and *v*) as an adjunct to the arrangement of the maxillary anteriors He believed the teeth should be arranged so that these fricatives can be pronounced easily and naturally Landa also maintained that proper vertical dimension is the key to proper pronunciation of the *s* and *sh* Sears[3] reported that clearer *s* pronunciation will result from fashioning the area of the anterior median ridge according to the type of tongue He recommended making a groove in this area for the broad tongue with a slight median sulcus, and the building of a ridge in this area for the tongue with a deep median sulcus Sears also advocated taking a palatogram in cases in which the median sulcus of the tongue does not coincide with the midline Pound[4] believed that the entire lingual aspect of the maxillary denture should be contoured to simulate the normal if proper phonetics is to be attained Many authors recommend the reproduction of the rugae as an adjunct to proper phonetics Probably the oldest and most widely used procedure for improving speech is the thinning of the entire lingual surface of the maxillary denture in order to create more room for the tongue

The literature in phonetics was perused with special attention given to tongue positions in phonation A moment s reflection of elementary physics recalls that all that is required to produce sound is a source of energy and a vibrator The source of energy for the voice is expired air from the lungs and the vibrator is the margins of the vocal folds in the larynx As air passes the highly sensitive vocal folds appropriate portions of the margins vibrate to produce the desired sound This sound is modulated by the larynx the laryngeal pharynx and the nasopharynx the nose and the oral cavity all of which act as cavity resonators to give resonance to the voice Further modulation is brought about by the articulation which takes place between the vocal folds the velum and the pharynx the tongue and the velum the tongue and the hard palate the tongue and the teeth the lip and teeth and finally the lips themselves

The tongue plays a major role in speech It changes position and shape for the pronunciation of each of the vowels and it is the principal articulator for the consonants In pronouncing the consonants the tongue contacts various portions of the teeth, the alveolar ridge and the hard palate Inasmuch as these structures are either replaced or covered by the artificial denture it was basic to the study to know exactly which portions of these structures are normally contacted by the tongue in pronouncing a given consonant To accomplish this palatograms were made on a group of dentulous persons with normal speech who were chosen so as to incorporate a maximum variety of tooth arrangement tooth occlusion arch form arch size vault form, and vault depth

PROCEDURE

P l toy ms f th Dentulous G oup

A uniformly thin artificial palate was constructed of methyl methacrylate for each subject The palate was inserted and tested for retention and adaptation The subject practiced speak ing with the palate in place until speech became clear Trial tests for the palato gram were made by having the subject pronounce a given sound and open his mouth without again con tacting the palate with his tongue The palate was then removed thorou hly dried dusted with nonscented talcum powder and carefully inserted in the mouth The subject was then asked to pronounce the previously practiced sound and the palate was carefully removed and examined The moist tongue removed the powder from the area of contact leavin a clear tracing (palatogram) on the artificial palate (fig 1) However after a short period this area dried and the tracing became obscure *In order to preserve the palatogram for future study the contact* area was outlined with a glass marking pencil immediately after the palate was removed from the mouth

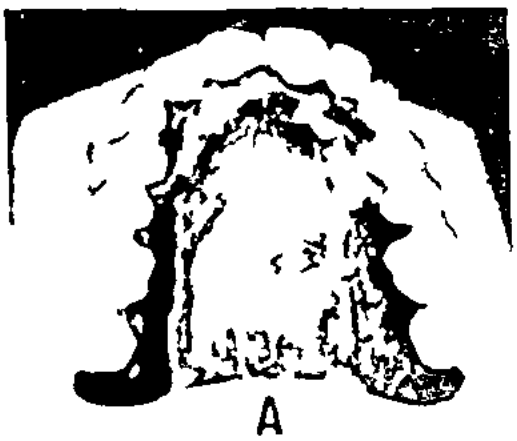
Palato grams were made for all the vowels and in studying and comparin these it was found that the tongue contacts portions of the palate in pronouncin all the vowels except *o* Therefore in making palato grams of the consonants the *o* was used in combination with the consonant to be studied even thou h the combination did not result in a standard word Consonants a lone could not be used because the pronunciation of any of the consonants involves two or more ound and therefore two or more tongue positions for example to pronounce *s* the *e* sound is made followed by the characteristic s s s of the *s* One has only to pronounce the *s* slowly to prove this to be true The same *e* ound precedes the *f l m* and *n* In pronouncin *t* the tuh is made first followed by the *e* The same *e* follows *b c d g p r* and *z* In order to avoid primary or secondary contact the *o* was used in combination with whatever consonant was studied

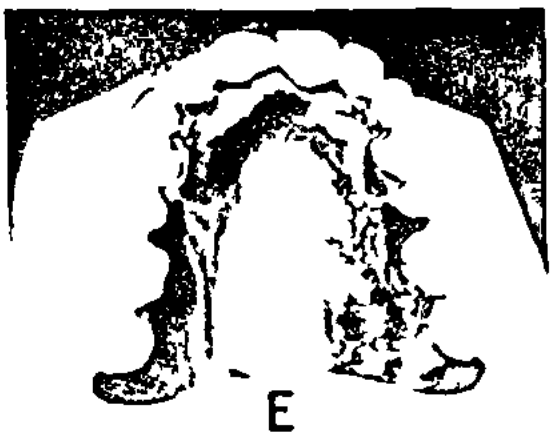
Palato ram of all the consonants were made and filed for study In studying and comparing the palato grams of the same consonant pronounced by different members of the group it was found th t no two persons contacted exactly the same area in pro nouncing the consonart but that a sufficient similarity ex isted to constitute a pattern (fig 2) The patterns for the *t d n* and *l* were not di tinct individually (that is it was not pos ible to look at a palato ram and determine which of these conso nants had been pronounced in making the tracin) however the group patt n for the e consonants was sufficiently distinct to be certain th t either the *t d n* or *l* had been pronounced in makin the tr cin A comparative analysis of the palatograms

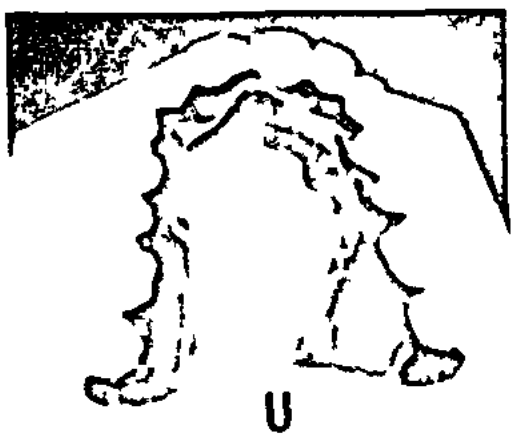
of the *s* and *sh* was of particular interest, because each of these presented an individual similarity and constituted a distinct pattern (figs 3 and 4)











Over 500 palatograms were made and by the palatographic tudy we were able to obtain a definite picture of tongue palatal contact for the pronunciation of the vowel or consonant In order to test the areas most sensitive to thickness various portion of the artificial palate were thickened in increments of 1 mm of wax The addition of 1 mm in the anterior region

(from cuspid to cuspid) made speech awkward difficult and indistinct The addition of 1 mm thickness in the posterior alveolar area made speech awkward but not indistinct The entire vault area could be filled with wax up to the outline of tongue contact without interfering with speech (fig 5)

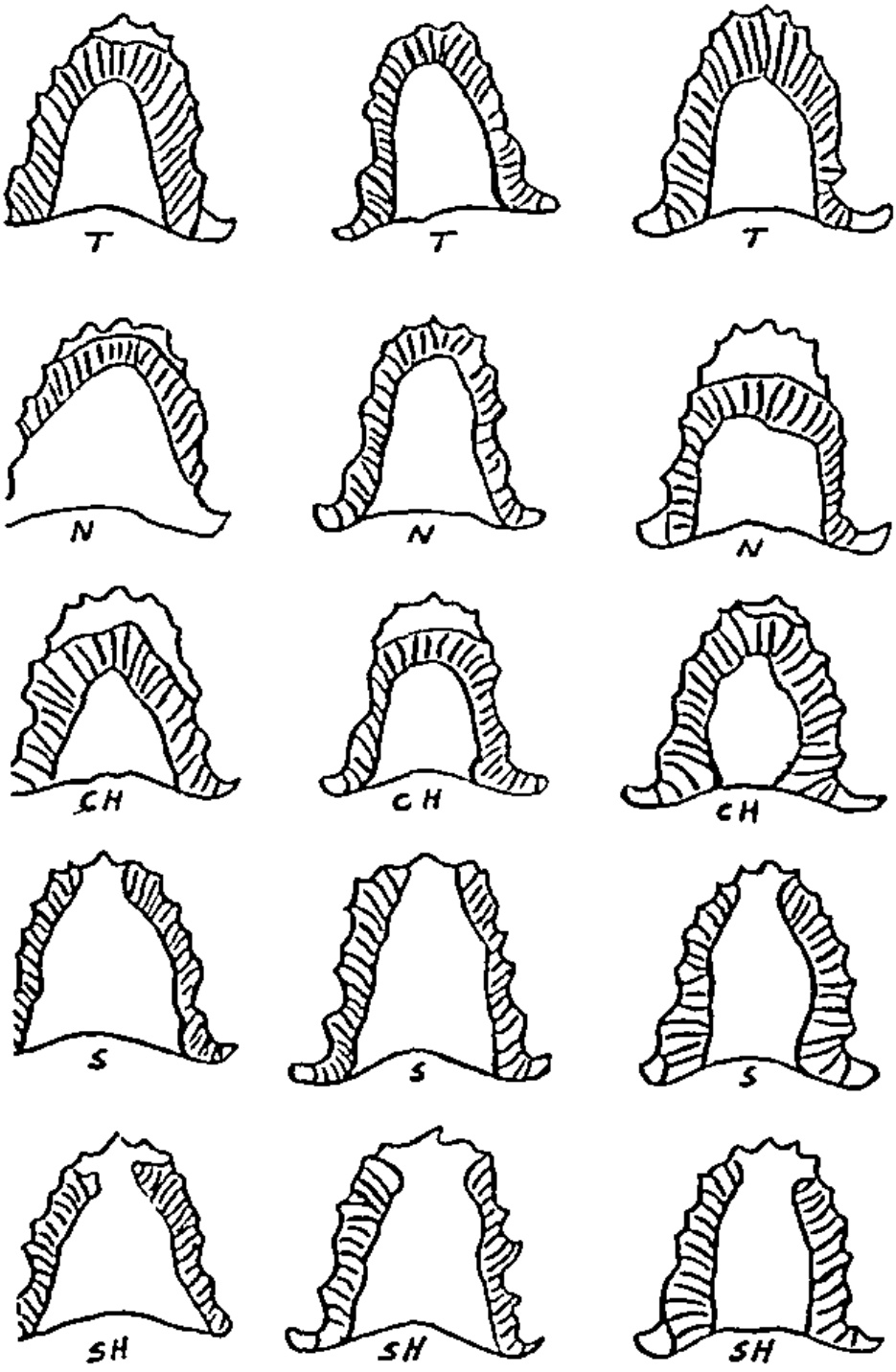


Figure — Palatograms of [illegible] typically similar to contacts

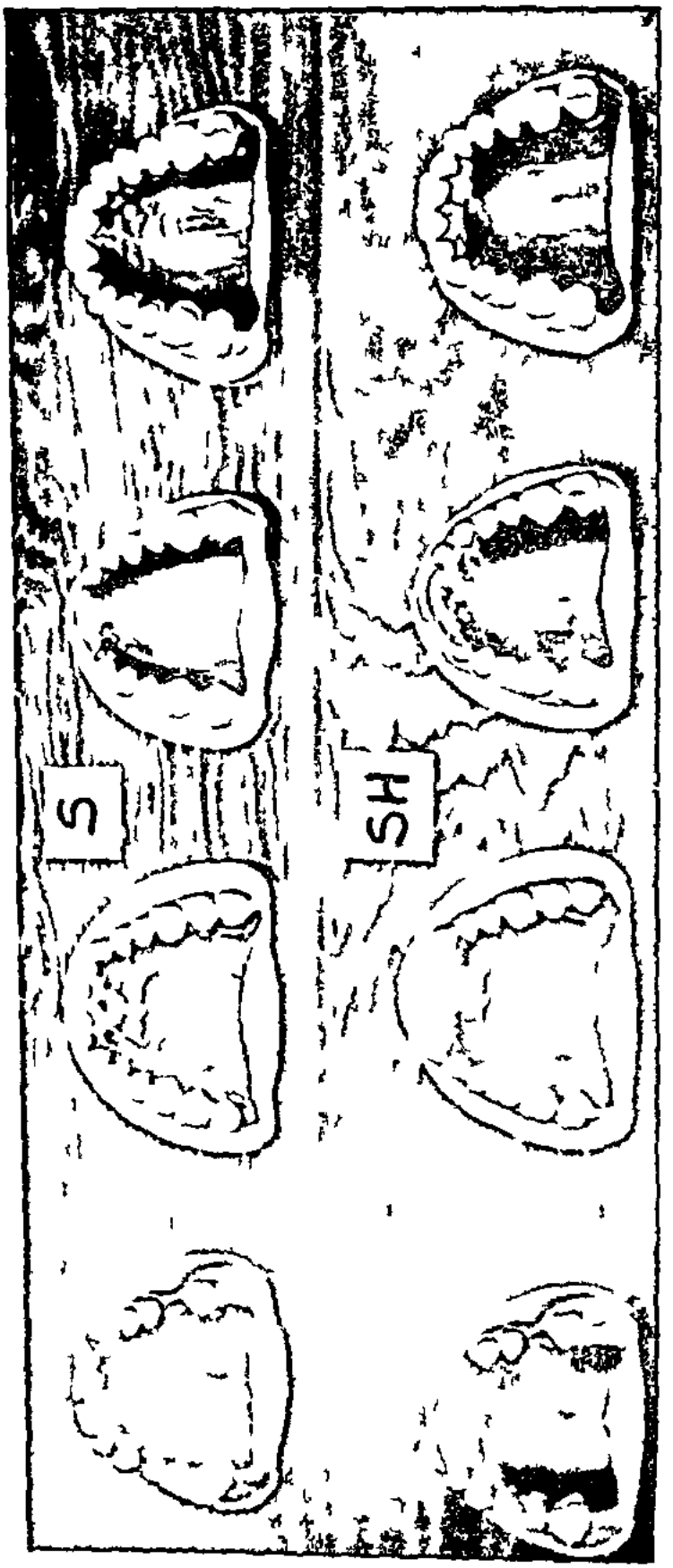


Figure 3 Palatograms showing pronouncing s and sh



Fig 4 Interpalatogram pro fig 11

The next phase of the investigation consisted of an experiment in this information into a procedure for artificial denture construction

Palatograms for the Edentulous Group

In the first part of this phase of the investigation an effort was made to use selective procedures in choosing subjects for the study The criterion was that the subject be edentulous and relatively

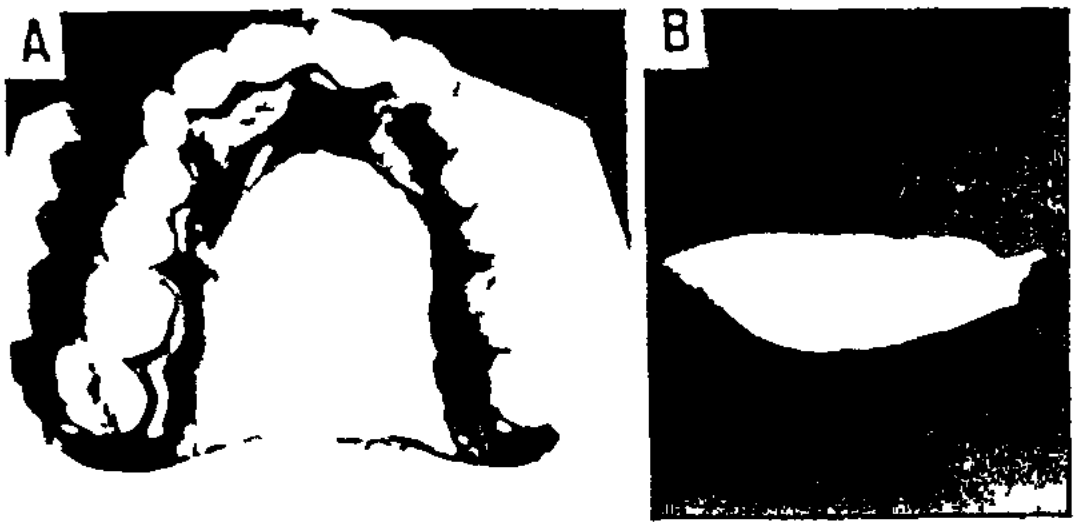


Figure 5 (A) Vault area (B) Corresponding

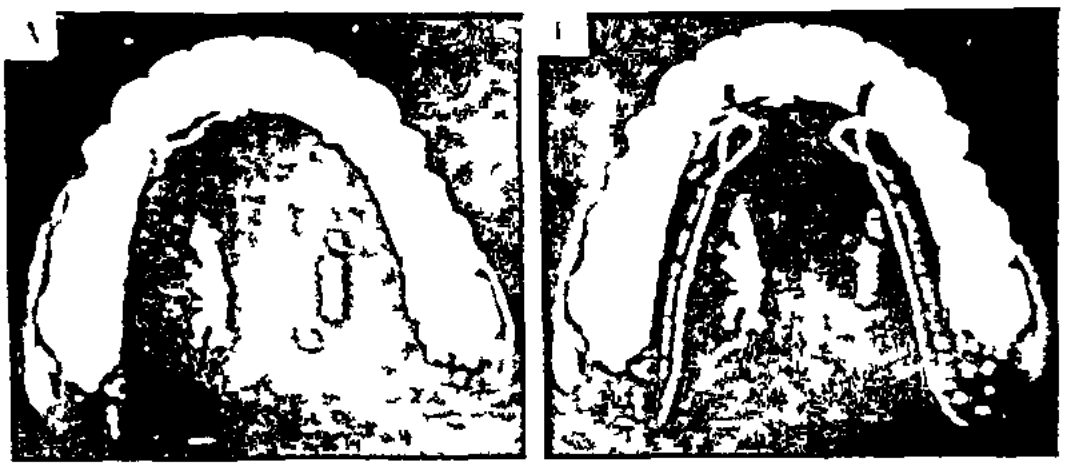


Figure 6 (A) Waxed surface between bas plate and collar of teeth (B) Area of tongue contact outlined with glass-marking pencil

logically ready for prosthetic treatment The application of the palatographic study was started while the dentures were in the waxed "try in" stage and after satisfactory esthetics correct centric proper vertical dimension and balanced occlusion had been attained The mandibular trial base was waxed to completion in the usual manner and the final waxing was done on the labial and buccal aspects of the maxillary trial base The waxing on the lingual surface of the maxillary trial base was

MODIFICATIONS OF REDDY METHOD FOR ESTIMATION OF 17 HYDROXYCORTICOIDS IN BLOOD

JOHN R PRIGMORE *Captain, USAF (MSC)*
IRA L SHANNON *Major USAF (DC)*
RALPH P FELLER *First Lieutenant USAF (MSC)*

IN 1950 Porter and Silber described a quantitative color reaction for 17 21 dihydroxy 20-ketosteroids From this development a wide variety of procedures for the determination of plasma and urinary corticosteroids has evolved Essentially all such procedures involve three phases extraction purification and colorimetric evaluation Borth recently presented a critical review of urinary methods in use at the present time Methods for the determination of blood corticoid have been reviewed by Gold

Alterations in plasma steroid levels appear more meaningful than urinary steroid changes in providing a quantitative interpretation of adrenocortical function in man Blood studies have considered primarily the free (unconjugated) teroids in peripheral blood

In the search for a more definitive reflection of the rate of adrenocortical secretion Peddy and associates developed a butanol extraction procedure for the determination of plasma total 17 hydroxycorticoids (17 OHCS) These worker considered the term total justified on the following bases (1) the earlier use of butanol for the extraction of water soluble conjugated estrogens and 1 ketosteroids (2) the spectral curve similarities obtained between known and unknown extracts when using the relatively specific Porter Silber reaction and (3) the correlation of steroid secretion and excretion rates with known states of adrenal cortical function The method devised by Reddy and associates included steroid extraction from plasma with butanol (butyl alcohol) and sodium sulfate purification with sodium carbonate evaporation of the solvent and color development with a sulfuric acid ethyl alcohol phenyl hydrazine reagent

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From Department of Physiology and Experimental Dentistry U S Air Force School of Aviation Medicine Randolph Air Force Base Texas Report 59-24

The need for 10 ml of plasma in the Reddy method led other investigators[6] to develop a micromethod for total 17 OHCS Utilizing 3 ml of plasma per assay, these workers reported values that were not substantially different from those found by the Reddy technic

When work was undertaken in this laboratory to incorporate the determination of blood 17 OHCS in a current study on physio-

TABLE 1 *Comparison of 17 hydroxycorticoid extraction and purification procedure*

Sample No	10-min extraction with butanol 5-min purification		10-min extraction with butanol 10-sec purification		5-min extraction with butanol 5-min purification	
	Mean	SD	Mean	SD	Mean	SD
1	55 6	5	0 6	4 3	49 4	5 5
2	46 6	[illegible]	21 2	5 2	45 5	9 0
3	51 6	8 8	8 9	3 8	54 5	7 7
4	54 2	9 8			45 9	6 3
5	5 [illegible]	5 3	31 5	18 9		

Mean of four determinations expressed in gamma per 100 ml

logic changes evidenced by aircrew personnel several technical difficulties were encountered This report is concerned with these problems and a determination method based on their solution

TECHNICAL CONSIDERATIONS

Protein precipitation Difficulty was encountered in initial attempts to duplicate the micromethod of Brancaccio D Alessandro and De Luca Values averaging 10 gamma per 100 ml were obtained in contrast to a mean of 31 gamma per 100 ml reported by the Italian workers Only after the incorporation of a stepwise thorough mixing of plasma with the protein precipitating reagents were acceptable values obtained The technic used is described in detail later in this report

Steroid extraction In an attempt to achieve maximal extraction of blood steroids into butanol a comparison was made between the conventional 5 minute extraction period and a 10-minute period The longer period produced slightly higher steroid values (table 1) and for this reason has been incorporated in the procedure used in this laboratory Extraction periods longer than 10 minutes produced no increase in steroid values

MODIFICATIONS OF REDDY METHOD FOR ESTIMATION OF 17 HYDROXYCORTICOIDS IN BLOOD

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F m D p rtm f P h l gy nd E p 1 D sis ry U S Air For f A ia Med R d lph A F B T R p rt 59- 4

Extract purification To remove nonspecific chromogens Peddy and associates added anhydrous sodium carbonate to the butanol extract and the mixture was thoroughly shaken

TABLE 2 *Eff t f t mp tur th v p t / but l t t f 17 hyd yc t id*

T mp tur (C)	T m f p (m)	17 hydr y rt d	
		M	S D
95 97	8-10	33 5	9 5
85 87	14 16	47 0	6 9
80-82	17 22	46 5	2 9

M f f d t m p ed g mm p 100 ml

Brancaccio D Alessandro and De Luca incorporated an apparently arbitrary period of 5 minutes for shaking the extract To clarify requirements for purification a comparison was made between the use of a 5 minute mechanical shake of the carbonate

TABLE 3 *Eff t / / g p t / pl ma / lt t*

S mpl N	17 hyd y rt d (gamm p 100 ml)	
	Pl m	PFF
1	67 4	75 0
2	63 5	59 0
3	61 2	63 5
4	39 5	27 0
5	37 5	31 2
6	18 8	14 5
7	27 0	31 2
8	86 2	79 5
9	72 8	68 2
M an	52 7	49 9

C mpl y d t f h pl m mpl

A y w rr d f h pl m p 3 f p o- dur (p n-f f l) h f l w f d y m- pl 3 72 h ur l

treated butanol extract and a vigorous 10-second digital shake The 5 minute shaking period proved to be a more effective procedure (table 1) Shaking in excess of 5 minutes did not provide additional purification

Drying of extract Brancaccio D Alessandro and De Luca stated that the butanol extract was dried in a "tube" at 80° to 85°C while Reddy and associates[4] recommended drying in an Erlenmeyer flask suspended in a 90° to 95°C water bath Efforts with these evaporation technics proved either unsuccessful or excessively time consuming Dryness could not be achieved without complicated aspiration apparatus to compensate for reflux tendencies Use was then made of weighing bottles with ground glass rims, 50 mm high and 40 mm in diameter By a technic described later in this report 21 samples can be dried together in 17 to 22 minutes Subsequent incubation of these samples was carried out in the same bottles thus affording greater accuracy as well as simplified methodology

Additional experiments proved that temperatures as low as 60°C produced mean values virtually identical to those for 85° to 87 C and 80 to 82 C (table 2) The 80° to 82 C range was used because of the better duplication of values obtained on replicates dried at that temperature

TABLE 4 *Comparison of 17 hydroxycorticosteroid levels in plasma and serum*

Sample No	17 hydroxycorticoids (gamma per 100 ml)	
	Plasma	Serum
1	52 2	50 0
2	34 0	41 0
3	45 5	47 5
4	50 0	50 0
5	31 8	36 2
6	72 8	72 8
7	54 5	52 2
Mean	48 7	49 9

Sample storage Because a complete set of 2 standards and 2 blanks required [illegible] able to determine if the sample contained protein free filtrate (PF F) stage, the [illegible] completed later Two complete [illegible]

pleted from the PlF state in a sin_le workin_ day Although sli_htly higher levels were obtained from an uninterrupted plasma assay (table 3) the greater convenience associated with freezing at the PlF state warranted its incorporation in the routine analysis of large numbers of blood samples

Plasma versus serum In associated blood electrolyte studies the use of serum was advanta_eous A comparative study of steroid levels in plasma and serum revealed no systematic differences (table 4)

RLAGENTS

It is mandatory that the highest grade rea_ents be used in this proceaure Inferior grade or contaminated lots of butyl alcohol sulfuric acid ethyl alcohol or phenylhydrazine produce excessively high blanks and erratic standard curves The re a_ents listed in this report have proved satisfactory when purified and used as indicated

1 Zinc sulfate 10 percent Dissolve 100 grams of ZnSO 7H O (reagent grade) in distilled water and dilute with water to 1 000 ml volumetric flask

2 Sodium hydroxide 0 5 normal Dissolve 20 grams of NaOH (U S P pellets) in distilled water and dilute with water to 1 000 ml in volumetric flask

3 Sulfuric acid 50 percent Add 100 ml of concentrated H SO (Fisher reagent grade) to 100 ml of distilled water

4 Sodium sulfate anhydrous granular (reagent grade)

5 Butyl alcohol (Mallinckrodt analytical reagent grade) This reagent is purified according to a procedure described by Reddy

6 Sodium carbonate anhydrous (reagent grade)

Ethyl alcohol (absolute pure EtOH U S Industrial Chemicals Co) Redistill before use

8 Sulfuric acid 62 percent Add 620 ml of concentrated H_2SO_4 (Fisher reagent grade) to 380 ml of distilled water

Phenylhydrazine hydrochloride (Baker purified) This reagent purified according to the procedure described by Peterson and Kahre

10 Phenylhydrazine reagent To 5 ml of 62 percent sulfuric acid add 8 5 mg of phenylhydrazine hydrochloride This reagent is prepared fresh before use

11 Blank reagent For each liter of 62 percent sulfuric acid add one gram of phenylhydrazine hydrochloride

12 Hydrocortisone standard Transfer 5 mg of hydrocortisone dissolved in 100 ml of butyl alcohol This stock solution remains stable for

at least 6 months in the refrigerator A dilute working standard is prepared by diluting 2 ml of the stock solution to 100 ml with n butyl alcohol (2 gamma per ml)

PROCEDURE

Extraction The extraction procedure is carried out as follows

1 To 5 ml of plasma or serum in a 15 ml ground glass stoppered centrifuge tube 1 ml of 10 per cent $ZnSO_4$ is added The mixture is shaken vigorously for 30 seconds and an additional 1 5 ml of $ZnSO_4$ solution is added The mixture is again shaken vigorously for 30 seconds An identical additive procedure is carried out with 2 5 ml of 0 5 normal NaOH

2 After centrifugation for 30 minutes at 2 500 r p m the supernate is decanted into another tube and recentrifuged for 10 minutes at 2 500 r p m (Second centrifu_ation is essential to provide adequate supernate)

3 The supernate is decanted into a 25 ml ground glass stoppered tube containin_ 3 drops of 50 per cent H_2SO_4 (If it is necessary to interrupt the procedure the sample may be frozen at this point) Two grams of sodium sulfate are added and the tube is shaken vigor ously until the Na_2SO_4 has dissolved

4 Five milliliters of n butyl alcohol are then added and the mixture is agitated at maximal speed on a mechanical shaker (Model CC wrist action shaker Burrell Corporation Pittsburgh Pa) for 10 minutes

5 After centrifugation for 10 minutes at 2 500 r p m as much of the butanol supernate as possible is transferred to a 15 ml ground glass stoppered centrifuge tube (Delicate control of aspiration is effected by the use of a fixed 20 ml syringe attached by rubber tubing to a 5 ml pipet)

Purification The purification procedure is as follows

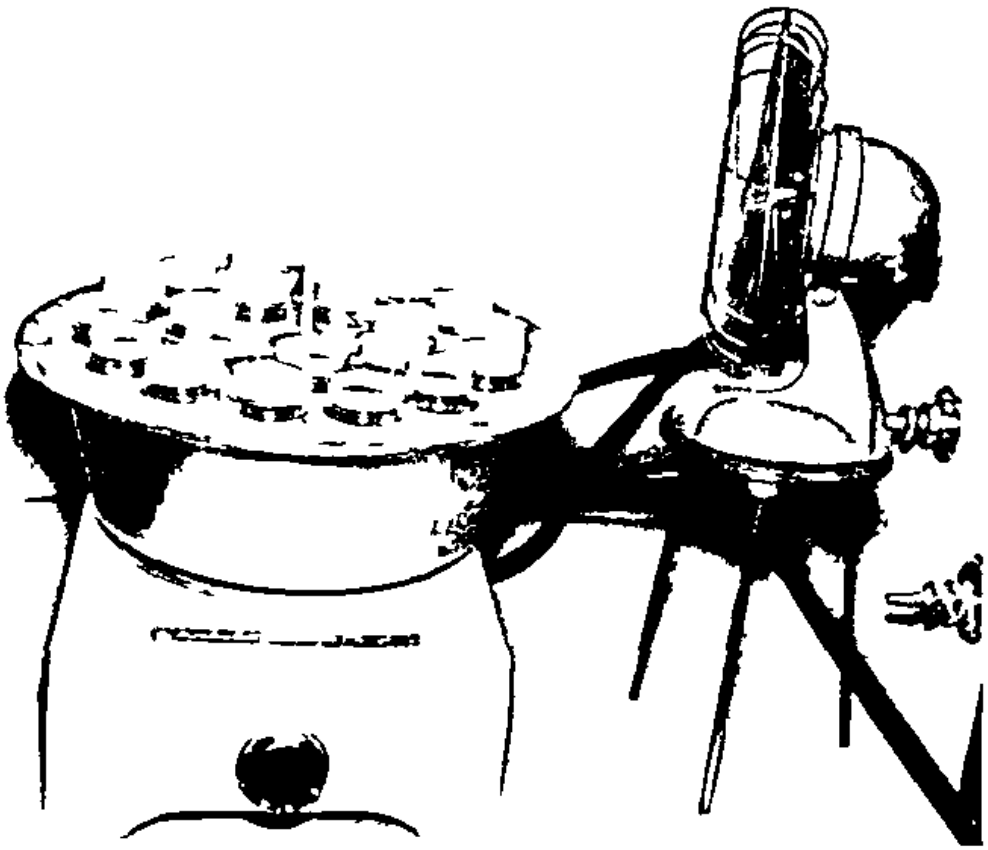
1 To the butanol extract is added 0 15 gram of sodium carbonate and the tube is agitated at high speed on the mechanical shaker for 5 minutes

2 The mixture is allowed to stand for 5 minutes and is then centri fuged for 5 minutes at 2 500 r p m A 4 ml portion of the extract is transferred into a weighing bottle

3 The contents of 21 of these bottles are then dried simultaneously in the following manner

Utilizing an electric hot plate water in a round stainless steel pan (12^1_2 inches upper inside diameter 9 inches lower inside diameter 5 inches depth) is maintained at 80 to 82°C A sheet metal cover of two circular layers held 1^1_8 inches apart by metal screws is placed on the pan The upper layer the rim of which fits flush against the flange of the pan is 14^5 inches in diameter and contains 22 holes

e ch 1/ inches in diameter The lowe c rcular layer 12 nches in diameter cont ins twenty two 1 inch diameter h les situ ted dir ctly under th larg r holes of th upper l ye A s al to the pa is afforded by rubb r tubing fitted round the rim of the lower laye We ghing bottles placed in e ch f 21 upper holes compl tely cover the lower h le A thermomet r s pla ed in th ther open g Water level is m ntained just b l w th b e of the w igh ng bottl



F gur I Eq pm t d ap t f b t not

e nt re setup pl ced n a clo ed hood w th the h od fan it g thro ghout the drying per od A small hous hold fan loc ted co ne of th h od is turned on fter the bottles ha be n on v ter bath fo a 4 minute per od Air from the fan s d rect d o er ent g oups of bottles by rotat g the pan a qu ter turn each 4 tes This q pm nt is ll strated figure 1

olorrietry This is determined by the following procedure

When p rat on is complete 2 5 ml of the bl nk eagent s d directly t each weighing b ttle and ground gl s stoppers nserted Th conte ts are mixed thoro ghly by dig t l rotation bottles

Th bottles e pl ced n wat r bath t 60 C f r 20 minutes l d unn g t p w te for 5 m ut

3 The content of each bottle is pipetted into a 10 mm Corex cuvette and read in a Beckman DU spectrophotometer at a wave length of 410 millimicrons against a water blank

4 Then 0 1 ml of phenylhydrazine reagent is added to each bottle the cuvette content returned thereto and the bottles reincubated at 60 C for 20 minutes They are again cooled the contents poured into the same cuvettes as before and a second reading made at 410 millimicrons against a water blank With meticulous care the required transfer of samples between bottles and cuvettes can be carried out without loss of fluid

5 In each routine analysis of 16 plasma samples two 5 ml aliquots of distilled water are carried through the entire procedure to serve as reagent blanks and two 5 ml samples of butanol containing 2 gamma and 4 gamma of hydrocortisone respectively serve as standards (Because a 4 ml aliquot is taken in step 2 of the purification procedure the final standard solutions contain 1 6 gamma and 3 2 gamma of hydrocortisone respectively)

Calculations

A = reading after phenylhydrazine addition

B = reading before phenylhydrazine addition

a = A − B (sample)

b = A − B (standard)

c = A − B (reagent blank)

a − c = corrected optical density (C O D) of the unknown sample

b − c = C O D of standard (then equated to 1 gamma)

$$\text{Gamma of hormone present in 100 ml of plasma} = \frac{\text{C O D sample}}{\text{C O D standard}} \times 25$$

Sample Calculation

Sample	*Standard (1 6 gamma)*	*Reagent blank*
A 191	A 049	A 030
B 150	B 017	B 014
a 041	b 032	c 016

a − c = 041 − 016 = 025 C O D sample

b − c = 032 − 016 = 016

016 − 1 6 = 010 C O D standard

$$\frac{025}{010} \times 25 = 62\ 5 \text{ gamma per 100 ml}$$

RESULTS AND DISCUSSION

Figure 2 illustrates a representative standard curve obtained with hydrocortisone as reference standard The results conformed to the Beer Lambert law The precision of the method based on the average difference between 95 sets of duplicates indicated a standard deviation of 5 48 and a coefficient of variation of 10 38 per cent

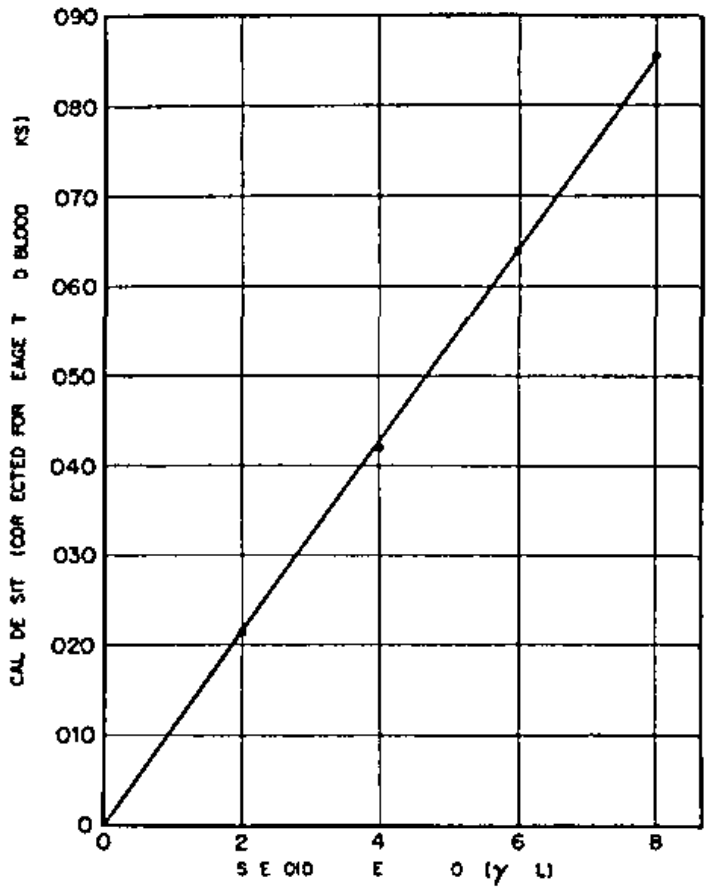


Figure 2 A typical standard curve showing the relationship between the quantity of hydrocortisone added to 17 hydroxycorticoid

Recovery studies were carried out by adding known amounts of hydrocortisone in water either to plasma PFI or to untreated plasma samples Table 2 shows that although essentially quantitative recoveries (mean 98 per cent) were obtained by adding standard hydrocortisone at the PFI stage relatively poor recoveries (mean 6 per cent) resulted from addition of hydrocortisone to plasma When known amounts of hydrocortisone dissolved in butanol were added to the protein free filtrate in step 4 of the extraction procedure essentially the same recoveries were obtained as found when the water solution of hydrocortisone was added to the PFI The Italian workers reported recoveries of 9 to 101 per cent when cortisone in butanol was

added durin_ either the extraction or the dryıng phase Reddy and associates[4] reported recoveries ranging from 94 to 120 per cent when aqueous cortisone vas added to plasma before pre paring a protein free filtrate In neither case was it readily apparent at exactly which step in the procedure the standard solution was added The reason for the low recoveries on adding hydrocortisone at step 1 of the present study was not clear The loss of synthetic steroid, evidently into the protein precipitate, is currently under investigation

TABLE 5 *Recov ry of hydr co tisone (compound F) added to plasma o plasma ext acts*

S mpl No	F present in sampl (g mm)	F added to plasm (gamma)	F added to protein-free filtrate (gamma)	F found (g mma)	F recovered (per cent)
1	2 66	2 0	0	2 85	61
2	66	4 0	0	4 70	71
3	2 66	6 0	0	5 10	59
4	2 27	2 0	0	3 04	71
5	2 27	4 0	0	4 32	69
6	2 27	6 0	0	4 82	58
7	3 38	0	2 0	5 46	101
8	3 38	0	4 0	7 28	99
9	3 38	0	6 0	8 36	89
10	2 80	0	2 0	4 80	100
11	2 80	0	4 0	6 65	98
12	2 80	0	6 0	8 70	99

E h lu m n of two det min t o s

Physiologic levels 1 ifty two male subjects age range 18 to 22 years were studied at 0800 hours using the procedure described in this report A range of 9 to 82 gamma per 100 ml was found (table 6) with a mean of 41 2 gamma per 100 ml Reddy and associates recorded a range of 28 to 78 gamma per 100 ml with a mean of 46 gamma per 100 ml, in 6 subjects studied at 0830 hours The values of Brancaccio, D Alessandro, and De Luca[6] on 59 subjects varied between 12 and 66 gamma per 100 ml, with a mean of 34 gamma per 100 ml, the time of blood collection was not recorded

TABLE 6 *Plasma level / t tal 17 hydroxycortico ds mal young adult* *ampl d at 0800 hour*

S bj t N	17-OHCS (g mma/100 ml)	S bj ct N	17-OHCS (g mm /100 ml)	S bj N	17-OHCS (g mm /100 ml)
1	32 2	19	18 8	37	81 8
2	38 2	20	56 8	38	41 0
3	31 0	21	50 0	39	41 0
4	22 0	22	79 2	40	37 5
5	32 2	23	41 8	41	30 0
6	26 5	24	27 0	42	60 0
7	20 5	25	70 8	43	72 5
8	22 0	26	50 0	44	58 5
9	29 2	27	27 4	45	31 8
10	27 0	28	29 2	46	38 2
11	54 2	29	60 5	47	46 8
12	39 5	30	72 8	48	23 2
13	31 2	31	56 8	49	45 0
14	31 2	32	44 9	50	55 2
15	29 2	33	56 8	51	9 0
16	10 5	34	36 2	52	30 0
17	54 2	35	45 5		
18	20 8	36	63 8		

SUMMARY

A procedure evolved from modifications of existin, technics for the estimation of total 17 hydroxycorticoids in blood has been described The precision of the method based on the aver age difference between 9 sets of duplicates indicated a stand ard deviation of 5 48 and a coefficient of variation of 10 38 per cent Essentially quantitative recoveries (mean 98 per cent) were obtained by adding hydrocortisone to protein free plasma filtrates relatively poor recoveries (mean 65 per cent) resulted from addition of hydrocortisone to untreated plasma samples A range of 9 to 82 gamma per 100 ml was found in a series of 52 subjects with a mean of 41 gamma per 100 ml

ACKNOWLEDGMENT Th th w h t p h ppr on t O O Cl yt E F p D C Sh ffl and R H G l J f h h al W O B en h wh p pared th 25-ml g d gl pp d b d t p 3 f h t p edur and t F V Garb h wh d g ed h h et m l d th p f t on pr edur

REFERENCES

1 P rter C C nd Silb r R H Quant tati color r ction for cort s ne d relat d 17 21-dihydroxy 20-k tosteroid *J B ol Chem* 185 201 207 July 1950

2 B rth R Pr bl ms r l t d to h mical say f corti ster d i human body fluid *Acta endocrinol* 22 125 135 Jun 1956

3 G ld J J Bl od cortic d th ir me ur m nt a d g ificanc re w *J Cl n Endocrinol* 17 296-316 F b 1957

4 R ddy W J Ab Hayad r N L dl w J C R old A E and Thor G W D t rminati of t t l 17 hydro yc rt d i pl sma *J Cl n Endocrinol* 16 380-390 Mar 1956

5 R ddy W J J ki D nd Thor G W Estim t on f 17 hydr y o ti d i ur *M tabolism* 1 511 527 No 1952

6 Branc ccio A D Al dr B a d De L c R M c m todo p r il do agg o d i 17-OH st r idi tot li pl smati i *Fol a endocrinol* 10 279 285 Jun 1957

7 R ddy W J Modifi ti f R ddy-J nk s Thorn method for e t mati n of 17 hydr xyc rt ds in uri *M tabol sm* 3 489-492 Nov 1954

8 P t rs R E K rr r A nd G erra S L E luation f Silber Port r p o dure f r d t rmin t of pl m hydro rt o *Anal Chem* 29 144-149 J 1957

AGE OF PATIENTS WITH BLEEDING ULCERS

An advance in the treatment of bleeding peptic ulcers has been the recognition that older people with this condition are more likely to bleed to death than are those who are younger The dividing line between old and young is arbitrarily based at about the age of forty In younger people the blood vessels are more likely to be soft and when eroded they can contract to stop the bleeding On the other hand in older people the arteries are more likely to be rigid with arteriosclerosis and unable to contract Nearly all surgeons who have operated upon bleeding peptic ulcers have seen some older patients in which a rigid bleeding artery was projecting in the center of the ulcer Accordingly we tend to operate earlier on older patients with bleeding ulcers than on those who are younger No fixed rule is made but in general an older patient who continues to bleed or has recurrence of bleeding after 1 000 cc of blood has been administered is taken to the operating room In younger patients the period of treatment by transfusion alone may be prolonged to eight or ten units of blood I am convinced that this is an advance over the older method of postponing surgery until patients had stopped bleeding regardless of how many transfusions were necessary to keep him alive Some patients were lost who might have been saved by operation and there is good evidence that their number exceeds the mortality of the operation itself —Richard T Shackelford Advances in Upper Gastrointestinal Surgery *Connecticut Medicine* March 1959

PROBLEMS IN THE CONTROL OF INSECT DISEASE VECTORS

CHARLES C HASSETT *Ph D*

AMERICAN troops in the Naples area in 1944 were threatened with one of war's worst scourges an outbreak of louse borne typhus The danger was averted in a most dramatic way by the timely use of DDT then a newly discovered insecticide In 1951 the same threat arose in Korea After three futile attempts at control with DDT the compound was declared useless and the lice were finally brought under control by the use of lindane

These episodes illustrate vividly the serious problem now confronting entomologists both military and civilian The overwhelming success of DDT against disease carrying insects and later against agricultural pests persuaded many that the problem was not only solved but completely eliminated The disillusionment was great when one report after another showed that flies mosquitoes and other pest insects were no longer being killed by DDT We are now dealing with strains of insects that are resistant even immune to the toxic effects of DDT and a dozen newer insecticides which have been brought into use with no greater success

The outburst of enthusiasm following the first successes of DDT was of course confined to those who were not aware of the versatility of living organisms Many scientists foresaw the course of events and began to work on the problem of resistance The first investigations in the entomology laboratory of the Chemical Warfare Service were made in 1945 and by 1948 the Kidwood strain of resistant houseflies had been developed to the point of living in cages thickly coated with DDT These flies and many other laboratory stocks resistant to the new insecticides show how wonderfully plastic these insects really are and how quickly they become immune to many poisons used to control them

Armed Forces entomologists and sanitarians are therefore left not without weapons but with no confidence that their

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From Philology Department of Army Chemical Center Maryland

weapons will be effective at the moment when they are needed When DDT failed lindane, chlordane and many other compounds were substituted, one after another Finally, a group of organophosphorus compounds including parathion malathion and diazinon was rushed into use Successful control of insect pests has been achieved with a number of these agents, but invariably such success proves to be but temporary It is probable that in only a few unimportant geographic areas are there any insects not already exposed to chemical insecticides, and not resistant in some degree At first resistance is not serious, and heavier doses of chemicals overcome it At this stage the only results are the increased cost of control work and a heavier load on the supply system Later of course, control is lost and troops in the field are open to insect borne epidemics until a new insecticide can be brought into play Not only are costs increased and supply systems harassed, but advance stocking of insecticidal compounds must be done with care lest vast quantities of materiel become useless when insect pests become immune to their effects The loss of combat troops by disease and the drop in morale when epidemic diseases appear also must be counted among the dangers raised by the resistant strains of insects

What is resistance? It is not a new phenomenon merely a new and striking demonstration of that plasticity which has marked the evolution of living things Our first experience of the resistance to chemical poisons by insects occurred long ago African cattle ticks became resistant to sodium arsenite in 1937 and the California red scale insect became resistant to cyanide at least 10 years earlier

Members of the World Health Organization s Committee on Insecticides[1] have defined resistance as "ability in a strain of insects to tolerate doses of toxicants which would prove lethal to the majority of individuals in a normal population of the same species" It does not arise by a specific effect of any chemical agent on the individual insect It is a condition occurring in a group when all but a few are killed by the toxic agent The survivors and their descendants differ from the others in some way perhaps by their ability to detoxify the insecticide before it can kill them In this way nearly all breeding is from resistant insects and the new resistant strain predominates after several generations

The ability to detoxify a chemical poison is startling but it is one of the best established facts of resistance in house flies [2-] The tissues of resistant strains of this fly contain an enzyme called dehydrochlorinase, which converts DDT to DDE, a nontoxic compound Another way in which some insects have been shown to become resistant is by storage of the agent in some tissue usually fatty where it remains harmless Still

other insects exhibit what is called behavioristic resistance tl at is while they can be poisoned by contact with an insecti cide they avoid such contact by a change in their habits African mosquitoes frequently enter native huts bite the inhabitants and then rest on the house walls while digesting the blood meal In many places after huts had been sprayed to kill these resting mosquitoes they were found to be leaving the huts promptly and resting in trees outside This type of resistance is just as effective as detoxication in ensuring survival of the insect

The ultimate causes for resistance are genetic Individual insects differ in form size and other ways even thou,h a group may seem to be alike The presence or absence of a dehydro chlorinase is for example governed by genes If we assume a simple but quite possible arran,ement a dominant gene R will produce the enzyme and ensure resistance In a population of flies three kinds can exist I P Rr and rr When subjected to an insecticide such as DDT RR and Rr will survive rr indi viduals will be susceptible and die In the next generations fewer and fewer rr individuals will appear and eventually a wholly resistant stock will exist Should the resistant gene be a recessive the rate of change will differ but the end results will be the same Studies have shown that many known resistant strains are in fact governed by such simple sin,le gene factors Others are known to be controlled by more than one gene

Although we now know a great deal about resistance it is only a fraction of the information which we must have if we are to deal effectively with the problem Indeed the magnitude of the problem is even now growing faster than our research effort Practical and reliable methods for measuring the degree of resistance in any given population are being developed and put into use The frequent measurement of resistant levels will also tell us the rate at which it develops which permits a prediction of the time when any insecticide will become valueless These checks will also tell us whether reversion to suscepti bility occurs when insecticide treatments are stopped Some trains of insects revert rather quickly others seem to remain re istant Even when they do revert to normal however the reapplication of insecticides brings back re istance more rapidly than it developed at first

One of the reasons why we have so quickly exhausted the usefulne of the dozens of new insecticides is the phenomenon kno n a cro s re istance A strain of insects which becomes re istant to DDT for example is also found to be resistant to other compounds havin imilar chemical structures It is there fore not practical to ub titute one insecticide after another as resistance levelop It ha been found that all of our current in ecticides fall i to a relatively small number of groups such

as the chlorinated hydrocarbons (DDT), the cyclodiene derivatives (dieldrin), and four or five others Changes must be made from group to group, rather than from one compound to another

The maintenance of control over insect pests and disease vectors is not to be as easy as we hoped a few years ago Neither is it hopeless If we make the best possible use of our present knowledge and technics we should be able to hold the line until research provides better materials and methods The indiscriminate use of insecticides has been the cause of much of the resistance which now exists We have learned that the persistence of compounds like DDT which gives long term killing power to coatings on house and barn surfaces, increases the chances of resistance We know that resistance increases faster when insecticides are used against larvae rather than adults The proper use of this information can prolong the effective life of an insecticide The reduced use of insecticides should be accompanied by greater emphasis on sanitation

Research must proceed in a number of paths Biological control like sanitation, has received little attention of late, but seems to offer good possibilities This requires study of the predators and parasites of insect pests Practically all animals are held in check to some extent by their natural enemies and we can help ourselves by encouraging the destruction of insect pests by such means It is also possible that bacteria viruses and fungi can be utilized in many ways to reduce insect populations

Insecticide research has by no means reached the end of the road We still need insecticides of greater specificity so that we can kill those insects which are undesirable and leave untouched the bees butterflies and others which we wish to preserve The use of synergists that is compounds not especially toxic themselves but which increase the effect of insecticides can extend the usefulness of the chemicals we are now employing

A relatively new discovery suggests a way of reversing the development of resistance Japanese investigators have reported that a DDT resistant strain of fruit flies is susceptible to phenylthiocarbamide and that there is a single gene which governs this phenomenon This makes it possible to use DDT against such flies until resistance appears then the original state can be restored by the use of phenylthiocarbamide The alternation of these two compounds should be effective against fruit flies indefinitely If such lethal alternate compounds can be found for use against the pests and disease vectors which we need to control the present difficulty will be eliminated

Two other effective methods of controlling insects are now being developed Properly used in favorable places they can

go far to keep insect pests under control The World Health Organization is endeavoring to eradicate malaria by an intensive area by area attack on anopheline mosquitoes Earlier mosquito control campaigns were not thorough and surviving mosquitoes were able to generate resistant populations The World Health Organization now plans to use all available means to eliminate the mosquito population in areas where malaria is prevalent It is believed that mosquito populations can be reduced to the level where propagation will become impossible and the cycle of infection between humans and mosquitoes will be broken

The other attack is being conducted against the screwworm fly *Callitroga hominivorax* (Cgrl) in Florida This pest causes millions of dollars worth of damage to cattle Cold weather kills these insects it is therefore impossible for them to spread north into Georgia Once eliminated from the Florida peninsula they will be gone for good because there is no nearby reservoir from which the state can be reinfected The U S Department of Agriculture has inaugurated a campaign which is already showing excellent results It is based on the use of a powerful radiocobalt unit in which each week millions of screwworm flies are rendered sterile The dose necessary to produce this result does not impair the activities of the flies and they are then dispersed throughout the state by airplanes The object is to saturate the state with sterile male flies so that wild females will mate with them more frequently than with fertile wild males Eggs laid by these females will not hatch and a steady reduction of the wild population results With 50 million sterile flies being released weekly annihiliation of the screwworm is expected in about a year

The attacks on malaria carrying mosquitoes and the screwworm fly are operations which can only succeed in selected places against specific pests They do however show the kind of imaginative programs which are now possible Control measures on such large scales based on well planned research programs will undoubtedly extricate us from the predicament we are now in as regards to insect pests

REFERENCES

1 S th Rep b pers C mm I d W ld H lth Org on Gen Sw land J ly 23 1956 pp 7 13
2 S nburg J G and K C W D g d f DDT by an d p bl f h fl *Am Ent Soc Amer* 43 444-458 S p 1950
3 S b J G K C W d M or f ld H H DDT-d hyd hl an en y f und DDT h fl *J Agr Food Chem* 2 1125 1130 Oct 7 1954
4 M y k S S k C W d L pk H D b f DDT-d hyd ochl DL T h fl *J E on E* 50 359-360 Jun 1957
5 B n A W A. l po m C f M l ary E mol gy W g D C. 33 l O 1958

INCIDENCE OF CUTANEOUS ERUPTION DUE TO SULFAMETHOXYPYRIDAZINE

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SULFAMETHOXYPYRIDAZINE is a N substituted sulfonamide derivative [1] Clinical trials and in vitro sensitivity tests with gram positive bacteria have shown it to be as antibacterial as sulfadiazine [2 3] The pyridazine ring structure is thought to account for the drug s effectiveness in the control of dermatitis herpetiformis [5]

During a 12 month period, patients who presented the usual clinical indications for treatment with a sulfa drug because of bacterial upper respiratory or urinary tract infections, were given 1 gram of sulfamethoxypyridazine (SMP) initially and 0 5 gram daily for 7 days After excluding from this study those who had previously reacted unfavorably to a sulfa drug or a combination of drugs with a sulfonamide 223 patients remained Explanations were made to the patients to ensure their cooperation All members of the group were examined during and at least 2 weeks after treatment to evaluate reactions to the drug The patients ranged in age from 15 to 70 years and there were twice as many women as men

To establish the incidence of reported previous reactions to the sulfa drugs a separate group of 800 patients at our clinic was studied Of these patients, 5 3 per cent claimed to have had a cutaneous eruption or fever after their ingestion Because this figure includes problems of recall and diagnosis it exceeds the true incidence of allergic sensitivity to sulfa drugs

In our series of 223 patients receiving SMP only on a standard dosage program reactions occurred in 6 (table 1) an incidence of 2 7 per cent All of the reactions included a cutaneous eruption

Inasmuch as a wide variety of adverse reactions to the sulfa drugs has been described [6 7] and can be expected to occur with

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From U S N I D pensary Washington D C Dr Anderson is with University Hospital Ann Arbor Mich

Kynsben and sulfamethoxypyridazine made by Lederle Laboratories was used in this study

C

		f th py rupt pp ar d	D ip i f ne p i	Oth ig f i ty	Dur ti f (day)	R ma k
		3	G li ed m ul p pular h mor p d i po d ar	WBC — 1 200 M l i f d p hy	10	WBC→5 000 4 d y w h d tr tm t
	36	5	S n- yp w h purpur	Mal i f d p hy	6	N bl od h g
		8	M ul p pul r w h purpur	M l f d p thy	5	N bl od h g
		9	M ul p pular n- ar w h mild purpur	L w-gr d f	3	N bl od h g
a	34	13	M ul p pul r f w urt a	N	3	N blood h g
Mal	54	6	Urt gl t	N	1	N bl od h g

the use of SMP, repeated clinical and laboratory studies of each reaction occurring in our patients were made Each patient was seen by a dermatologist who confirmed that the cutaneous findings were characteristic of sulfa drug reactions The one patient who became febrile and developed a leukopenia showed a surprisingly rapid recovery, and had negative cephalin cholesterol flocculation tests during and after the period of eruption

Dorn[8] discussed the many problems of experimental design in drug reaction studies The mode of selection and the dosage must be uniform The patients must be instructed carefully and consistently followed up Obviously, such a study cannot be a retrospective evaluation of clinical records A 12 month period for collecting cases includes seasonal variation and can be conveniently repeated

The incidence of allergic reactions to sulfa drugs is greater when larger doses are used [9] In treating 85 patients with different amounts of SMP, Lindsay and associates[10] reported a 16 per cent incidence of dermatitis 14 per cent of which occurred in patients receiving 1 gram or more of SMP daily Jackson and Grieble [11] using 1 gram of SMP daily noted a 7 2 per cent incidence of dermatitis in 56 patients It is doubtful that a sulfa drug causing an incidence of allergic reactions greater than 5 per cent would be acceptable regardless of its antibacterial value [12] If patients are not instructed in the use of SMP they may erroneously prescribe for themselves the dosage used with the more familiar sulfa drugs

SMP is readily absorbed when taken by mouth has a satisfactory solubility in urine and a low rate of renal clearance These properties allow an antibacterial blood level to be maintained on small daily dosage An accepted therapeutic blood level is 10 to 15 mg of the free drug per 100 ml of plasma Patients receiving 0 5 gram of SMP daily will average blood levels in excess of 10 mg per 100 ml A similar level in children may be obtained with a daily dosage of 50 mg per kg body weight [13] A daily dose of 1 gram of SMP will raise the plasma concentration to 15 mg per 100 ml and prolong it One study showed that increasing the daily dose beyond 2 5 grams serves only to sustain the blood levels without elevating them The larger dose may be necessary in treating some urinary tract infections[13] and to obtain spinal fluid concentrations comparable to those shown in treatment with other sulfa drugs [14]

Sulfa drugs are effective in the treatment of epidemic cerebrospinal meningitis bacillary dysentery trachoma and cholera Sulfonamides in combination with streptomycin sulfate is indicated in the treatment of brucellosis, bubonic plague Friedländer s pneumonia and infections caused by *Hemophilus* influenzae [16] Histoplasmosis[17] and South American blastomycosis also respond to sulfa drugs

SUMMARY

Sulfamethoxypyridazine is an antibacterial agent which sustains adequate blood levels with small daily doses A 19 month study of 993 patients using this drug showed the incidence of reactions to be 2 7 per cent All of the patients reacting unfavorably recovered quickly The apparent safety of the drug with the dosage used in our patients recommends its further evaluation

REFERENCES

1 B ll P H d R bl R O J S ud i h m th py h y f l t f truc ur ty f ulf l mid typ mp nd *J Am. Chem. Soc* 64 2905-2917 D 1942

2 S b F R S h A. R A R d Gr nd E N U f ulf m th ypyrid (Ky) tr m f inf d *Ant b ot Med* 5 437 444 July 1958

3 Harr A P R l y H D J d K ght V Sulf m th ypy d i ur ary tr nf *A M A Ar b Int M d.* 100 701 708 N 1957

4 J ff J S lpham h ypyr d d m t h pet f m *Br t M. J* N 5090 209-210 July 26 1958

5 P ry H D d W k lm R K Ad lf th ypyridazi (Ky) tr tm f d m t h p if m *J A. M. A.* 169 127 132 J 10 1959

6 K b A H d L S L Cl l ity f b t l drug m p tl w f l tur b d 96 075 tr d w h ulf mid nd b *O t Surg* 5 347 352 Ap 1952

7 H hf ld B M. d S J J T t ulf m h ypy id (Ky) *New Y k J M d.* 58 1508-1510 M y 1 1958

8 D H. F S m ppl i f b m y i ll d lua f m d l d *J Chron. D* 1 638-664 Jun 1955

9 L hr D Cl l ty f ulf m d *Ann. New York Acad. S* 69 417 447 O 12 1957

10 L d y D G P l I B h ff A. J d B k S W S C d t ulf m h ypyrid *A. M. A. A b. Dermat* 78 299-303 Sep 1958

11 J k G G d Gr bl H G Sulf m h ypyr d i pharma l gi l b rv d l l us tr m f ur ary tr f *Ann. New York A ad. S* 69 493-500 Oc 12 1957

12 Low ll F C All g t ulf mid nd b drug *Ann. Int M d.* 43 333-344 A g 1955

13 R S Ahr W E d Zar mb E A Sulf me ho ypyr d ne l g t g ulf nam d m p l m ary l m l nd l bo oty b va nf nt nd haldr *Ann. New York Acad. S* 69 501 508 O 1 1957

14 B g W P Str kland C S d Gylf J M S lf m h ypyrid (ky) w l g g ulf nam d *Antibi t M d.* 3 378-387 N 1956

15 B g W P Th d ffus f ulf namid h br p l fl d mp t udy *A t b t M d.* 6 32-40 J n. 1957

16 Y w E M R lua f ulf m d h py *Ann. Int Med.* 43 323-332 Aug 1955

17 May R L E m P C. G f S K opk E nd T l J Sulf m mid d p m tal h pl mo *Ant b t & Chemotber* 6 215-225 Ma 1956

18 C N F M d l my l gy I D bo R J (ed) *Bacterial nd Myc t Inf t ons f lan. Md d n.* J B L pp tt Ph l d lphi P 1958 pp 582 625

THE ROLE OF THORACOTOMY IN THE DIFFERENTIAL DIAGNOSIS OF PLEURAL EFFUSION

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IT has long been axiomatic that primary pleural effusion in tuberculin positive individuals must be considered to be tuberculous until proved otherwise The basis for this axiom arose in the pre chemotherapy era when an appallingly high breakdown rate with significant tuberculous manifesta tions was noted in patients with pleural effusions followed for over five years

Roper and Waring for instance reported an over all five year breal down rate of 65 2 per cent in 141 patients treated in Army hospitals in the years 1944 and 1945 The breakdown rate was 90 9 per cent in those patients in their series treated with less than six months of bed rest and 30 6 per cent in those patients receiving over six months of bed rest Thus while the tuberculosis relapse rate remained appallingly high even with the best of treatment there was certainly a marked difference ascribable to prolonged bed rest

Compton[2] is currently reviewing 205 cases treated at Fitz simons Army Hospital in the years 1953 through 1956 and he has been unable to find any case of relapse to date in any patient who has received adequate chemotherapy by present day stand ards Personal observation by this author would bear out Comp ton s findings A great number of patients who were put on tem porary retirement from military service following pleural effusion have been observed in follow up reviews for a considerable period of time In none of these patients has there been any subsequent breakdown with significant tuberculosis, provided the original course of treatment was adequate

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F m P lm ry D S d D p m t f Path logy F t mo Army H p l D C l d
P d c nd d f m t th R g l M t ng f Th Am n Coll g f Phy C l rad Sp i gs C l d J nuary 17 1958 R pr ed w th pe mis on f m *Annal of Internal M dici* 50 11 33 J nuary 1959

In view of the high breakdown rate of untreated pleural effu sions and the excellent prognosis with adequate treatment the natural tendency at Fitzsimons Army Hospital as well as in most other institutions dealing with tuberculosis is to bend over backward and treat all cases where there is any doubt as to the possibility of a tuberculous etiology of a given pleural effusion We fully realize that this policy has resulted in unnecessary treatment in many patients who probably were not tuberculous but in whom the diagnosis of tuberculosis could not be disproved Because of the danger of withholding treat ment the presumption of guilt until innocence is proved has been the policy in the management of pleural effusion in recent years Inevitably this has led to a certain amount of unnecessary emotional trauma family hardship and economic loss In an economic sense there has been unnecessary cost of hospital ization and treatment and in the unique problem which arises in the Armed Forces we are certain that many have been paid medically unnecessary pensions for many years Heretofore this has always been considered a necessary price to pay for the safety of the individual for the reasons outlined above

From the foregoing it follows logically that if a method of differential diagnosis could be found which could be relied upon with a high degree of accuracy it would be possible to eliminate most nontuberculous cases and reserve prolonged chemotherapy for proved or strongly presumptive cases It would also be possible in many instances to establish a definitive diagnosis for the nontuberculous group of effusions and to in stitute proper treatment as indicated

It has seemed to us that in selected cases diagnostic thorac otomy with careful examination of the resected material offers a rational approach However certain factors must be considered which might possibly limit the value of thoracotomy Foremost of these is the influence of chemotherapy on the morphology and bacteriology of a pleural effusion Many cases have been on antituberculous drugs for a considerable period before they are considered for surgery Most surgeons are loath to operate on cases of possibly active tuberculosis without the adequate preoperative protection offered by chemotherapy Thus the influence of these drugs on tuberculous pleuritis will have to be determined

The next problem is one of surgical exposure A punch biopsy or limited surgical procedure might pick up a relatively normal area and overlook adjacent si nificant patholo y and thus give falsely negative results Breckler Hensler et al have recently reported on limited open biopsy technic in pleural effusion in a small se ries of cases They feel they can differentiate tuberculous effu sions from nontuberculous effu ions on morphologic bacteriologic

grounds in about 80 per cent of cases This is good but far from ideal and a number of cases given tuberculosis clearance by use of their technic are liable to subsequent breakdown with significant tuberculosis when their series is large enough After all their preliminary estimate would indicate that they will overlook about 20 per cent of cases of tuberculous pleural effusion

Donohoe et al in an excellent paper, point out the value of aspiration biopsy of the parietal pleura In their hands this simple procedure has been without risk, and it establishes a pathologic diagnosis of granulomatous pleuritis in a high percentage of cases without resort to more extensive procedures However these authors emphasize that a negative biopsy or findings of nonspecific pleuritis by no means exclude tuberculosis since a relatively high proportion of their negative needle biopsy findings was found to have granulomatous pleuritis at subsequent open thoracotomy

Needle biopsy, when positive would therefore seem to confirm a diagnosis of granulomatous pleurisy but negative findings are of no value in their exclusion of tuberculous etiology

To shed some light on this problem and possibly to offer better differential criteria for tuberculous versus nontuberculous pleuritis the records of 63 patients who received open thoracotomy for pleural disease at Fitzsimons Army Hospital during the years 1953 through 1956 have been carefully analyzed and reviewed and our findings in these 63 cases will form the basis of this paper A few of these patients were probably included in a previous paper by Stead Eichenholz and Stauss however the present review was made independently and no effort was made to correlate the cases reviewed at this time with the cases reviewed in any previous study

ANALYSIS OF CASES

Sixty three cases who received open thoracotomy during the years 1953 through 1956 are reviewed (table 1)

All cases had pleural involvement which either was due to tuberculosis or at some point in the course of the disease the possibility of tuberculous pleuritis was seriously entertained or could not be clinically excluded

The final diagnosis in 38 cases was tuberculosis and the remaining 25 patients were considered to have nontuberculous pleuritis The indications for thoracotomy were primarily diagnostic in 17 cases In 14 cases the indication was both diagnostic and therapeutic, and in the remaining 32 patients thoracotomy was primarily a therapeutic procedure

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acute pleural effusion as a manifestation of acute primary tuber culosis should be observed

TABLE 2 *Sk n test esults*

Tuberculin	Pos	Neg	Not d ne
F nal tuberculosis diagno is	35	0	3
F nal n ntuberculosis di gnosis	18	7	0

All b ous cu e pulmo ry t b r l i w th pos t p tum.

In practically all of our cases skin tests were also done for histoplasmosis and coccidioidomycosis eight cases had a positive histoplasmin skin test associated with a positive tuber culin and a negative coccidioidin Seven cases had a positive coccidioidin associated with a positive tuberculin and a negative histoplasmin Three patients were positive to all three antigens

In this series, which represented a high incidence of diag nostic problems, all the positive fungus skin tests occurred in association with a positive tuberculin test Thus fungus skin testing added one more diagnostic possibility in 15 cases and two additional possibilities in three cases but failed to be of any value in eliminating tuberculosis from the differential diag nosis

In general therefore positive skin tests add to the possi bilities but diagnose nothing However negative skin tests are of value in eliminating tuberculosis from consideration

PLEURAL FLUID FINDINGS

In 49 of our 63 patients one or more taps are recorded The description of the pleural fluid varies widely from record to record so that comparison is difficult However there do not seem to be any specific characteristics that consistently sep arate tuberculous from nontuberculous effusions

Seven of the 49 patients had a culture positive for tubercle bacilli or positive results from guinea pig inoculation of the thoracentesis fluid on at least one occasion Positive findings usually were obtained during the initial diagnostic phase prior to any intensive chemotherapy One patient had a positive smear which was unconfirmed on culture Positive smears without cultural confirmation are always open to a certain amount of question as to their validity We are thus left with seven sure and one probable bacteriologic confirmation from tests of the pleural fluid out of 38 proved tuberculous pleural effusions Pleural fluid bacteriology therefore was reliable in proving the diagnosis in only 21 per cent of our tuberculous pleural effusion cases This percentage is entirely too low to make negative pleural fluid bacteriology of any value in eliminating tuberculosis from the differential diagnosis

SPUTUM AND GASTRIC ANALYSIS

Sixteen of the 38 tuberculosis patients in our series had at least one positive finding reported on examination of their sputum and/or gastric aspirate Fourteen of these patients had cultural confirmation and two had positive smears unconfirmed by culture It is interesting to note that five of our 16 patients with positive bacteriologic findings had no evidence of parenchymal pulmonary disease clinically and no evidence of a parenchymal lesion was described at thoracotomy One patient had no clinical or x ray evidence of pulmonary disease except for his pleural effusion but definite evidence of parenchymal tuberculosis was found at surgery The remaining nine patients had obvious active pulmonary disease

The foregoing would seem to indicate that a relatively high proportion of patients with pleural effusions have active pulmonary or endobronchial foci so small as to escape detection by conventional methods but still capable of producing positive bacteriologic findings during the acute phase of the disease if diligently repeated sputums or gastric aspirates are obtained

On the other hand positive bacteriologic findings may at times be misleading One of our patients had two positive sputum cultures reported with negative guinea pig inoculations from these cultures and numerous subsequent negative gastric cultures His PPD was persistently negative on 10 examinations and at thoracotomy no demonstrable tuberculosis was found This man was given final clearance as not having tuberculosis as a result of his thoracotomy findings which revealed a hiatus hernia and a post traumatic fibrous pleuritis It is felt that in this case the positive cultures represented a laboratory error but one which v hich was exceedingly difficult to resolve

Since only about 40 per cent of our tuberculous effusions had even one single positive bacteriologic finding and many of these cases had known pulmonary disease in addition to their pleural involvement it is felt that the incidence of positive sputum or gastric findings is too low to give a reliable index as to whether a given effusion is or is not tuberculous

PULMONARY AND NONPLEURAL DISEASE

Many of our ca es had disease in addition to their pleurisy For purposes of discussion the 25 nontuberculous cases will be discus ed separately from the 38 cases with a final diagnosis of tuberculosis (table 3)

Seven of the nontuberculous case had no demonstrable pulmonary di ea e preceding or a sociated with their pleural ef fu ion either clinically or found at surgery These seven ca es were felt to be nonspecific pleural effusions of nontuberculous origin The pathologic findings were those of chronic fibrous

pleuritis Seven additional cases had a history of pneumonia preceding their pleurisy Three patients had surgically proved bronchiectasis associated with pneumonitis and pleural effusion In two patients pulmonary fibrosis and/or emphysema was present which may have played some role in the etiology of their effusion One patient had collagen disease manifested by a rheumatoid type of arthritis and an associated pleural effusion One patient had an old history of rheumatic fever with rheumatic heart disease, and his pleural effusion was felt to be on a rheumatic basis The pathologic findings in this case were compatible with a rheumatic pleuritis

TABLE 3 *Significant conditions possibly related to pleurisy in 25 cases with nontuberculous discharge diagnosis*

Previous pneumonia	7
Bronchiectasis (surgically proved)	3
Pulmonary fibrosis and emphysema (surgically confirmed)	2
Histoplasmosis (surgically proved)	1
Coccidioidomycosis (surgically proved)	1
Granuloma etiology undetermined probably histoplasmosis or coccidioidomycosis (surgically proved)	1
Diaphragmatic hernia containing omentum post traumatic (surgically diagnosed)	1
Collagen disease unclassified manifested by arthritis and pleural effusion	1
Rheumatic heart disease with rheumatic pleurisy	1
Nonspecific pleurisy No other condition clinically or found at thoracotomy to explain pleural effusion	7
Total	25

Three patients had a subpleural pulmonary granuloma discovered and proved at the time of surgery There was one case of histoplasmosis and one of coccidioidomycosis and the third case was discharged with the diagnosis of granuloma etiology undetermined This man had positive skin tests for histoplasmosis and coccidioidomycosis as well as a positive PPD The morphology of the resected granuloma was more suggestive of fungus infection than of tuberculosis One case was discovered at surgery to have a diaphragmatic hernia containing omentum which was associated with a post traumatic pleural effusion

Thus we see that 18 of our patients had some underlying involvement which might have explained their pleural effusion and in nine of these cases thoracotomy either established or confirmed significant pathology which might have been missed clinically or overlooked by limited diagnostic biopsy To our mind this would argue strongly in favor of an open exploratory

thoracotomy versus a more limited procedure in establishing a satisfactory differential diagnosis

In our experience the most common causes for nontuberculous pleuritis are in order of frequency

1 Nonspecific or idiopathic pleural effusion

2 Postpneumonic pleural effusion

Pleural involvement secondary to bronchiectasis or granuloma

Of the 38 cases given a discharge diagnosis of tuberculosis (table 4) pulmonary tuberculosis was known and established prior to surgery in 14 cases In 13 cases no pulmonary disease was clinically demonstrated and no pulmonary parenchymal involvement was found at surgery In nine patients there was no clinical or x ray evidence of any disease other than pleural effusion however definite pulmonary lesions were palpable and removed at thoracotomy In one patient an unsuspected tuberculous pericarditis was discovered at surgery One patient had a pleural effusion following a proved tuberculous meningitis with no evidence of pulmonary disease and nonspecific pleural findings at thoracotomy This case will be discussed in detail later on in the paper

TABLE 4 *Significant tuberculous conditions associated with pleural effusion in 38 patients with discharge diagnosis of tuberculosis*

Pulmonary tuberculosis known prior to surgery	14
Pulmonary tuberculosis discovered at surgery and additionally demonstrable by x ray	9
Tuberculous pericarditis discovered at surgery	1
Tuberculous meningitis with pleural effusion	1
*Pure tuberculous pleural effusion — no demonstrable disease	13
Total	38

We feel it is highly significant that in 10 out of 38 cases important evidence of tuberculosis other than pleurisy unsuspected clinically or by x ray was discovered at thoracotomy This would help to explain the not uncommon clinical observation that a positive sputum or a positive gastric aspirate may be found in what appears clinically to be a pleural effusion without other demonstrable disease We feel that this is an important argument in favor of full exploratory thoracotomy as opposed to the more limited biopsy procedures

The high coincidence of small but definite parenchymal foci in cases of tuberculous pleural effusion has been noted by many

observers for a great many years, and is by no means an original observation Stead et al [5] report that in 12 out of 15 patients with tuberculous pleural effusion definite subpleural parenchymal foci were demonstrated at the time of thoracotomy



Fig 1 Biopsy specimen showing a normal pleura with subpleural pulmonary tuberculous granuloma.

PATHOLOGIC FINDINGS

The original pathology reports were reviewed and the cases were classified as tuberculous or nontuberculous on the basis of these reports as follows



Figure 2 Diffuse tuberculosis—organizing granuloma

Nonspecific inflammatory change or definitely nontuberculous pathology was reported in 28 cases Tuberculous pleuritis or granulomatous pleuritis compatible with tuberculosis was reported in 32 cases In three additional cases the pleural biopsy findings were nonspecific, but definite tuberculosis was con

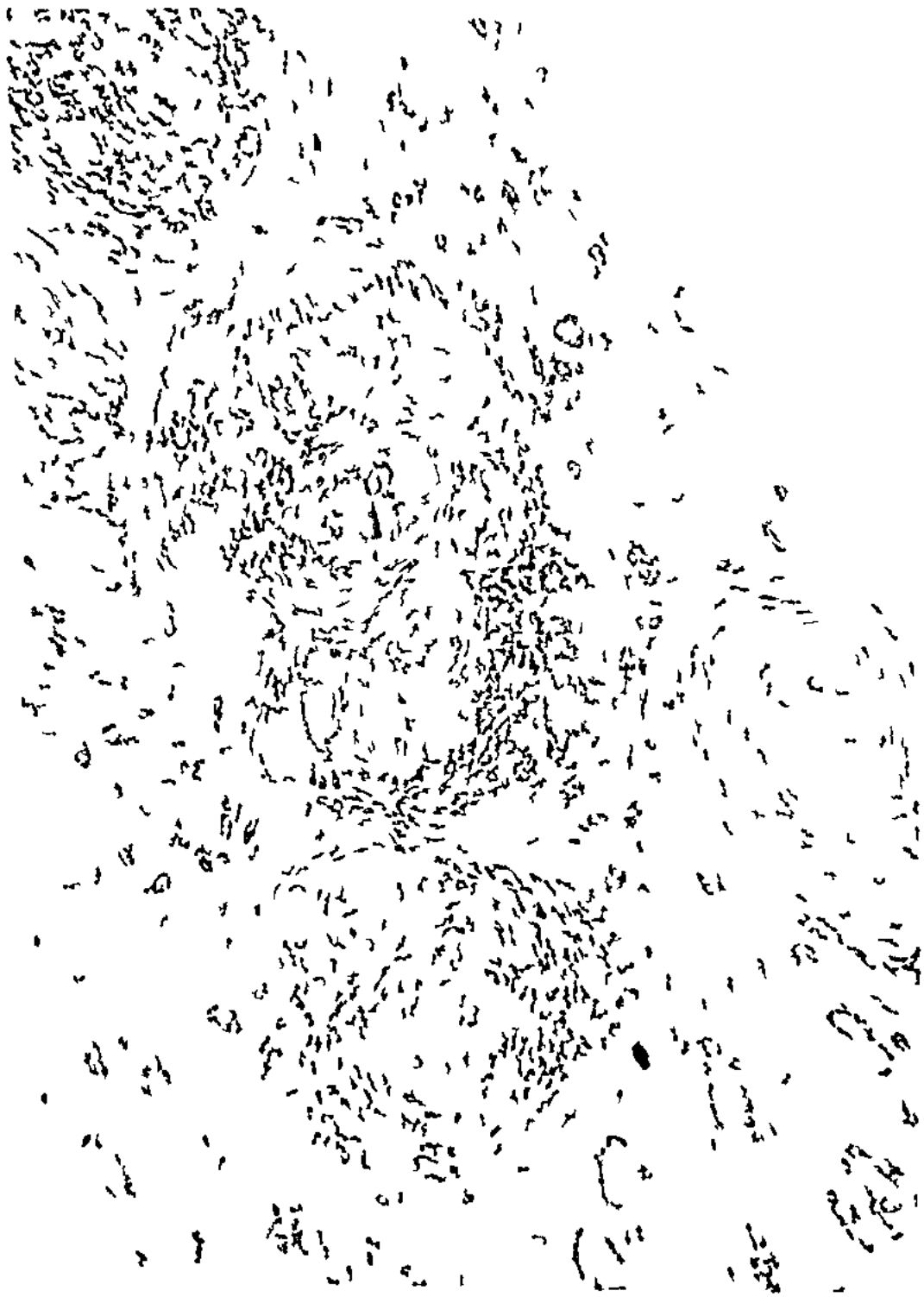


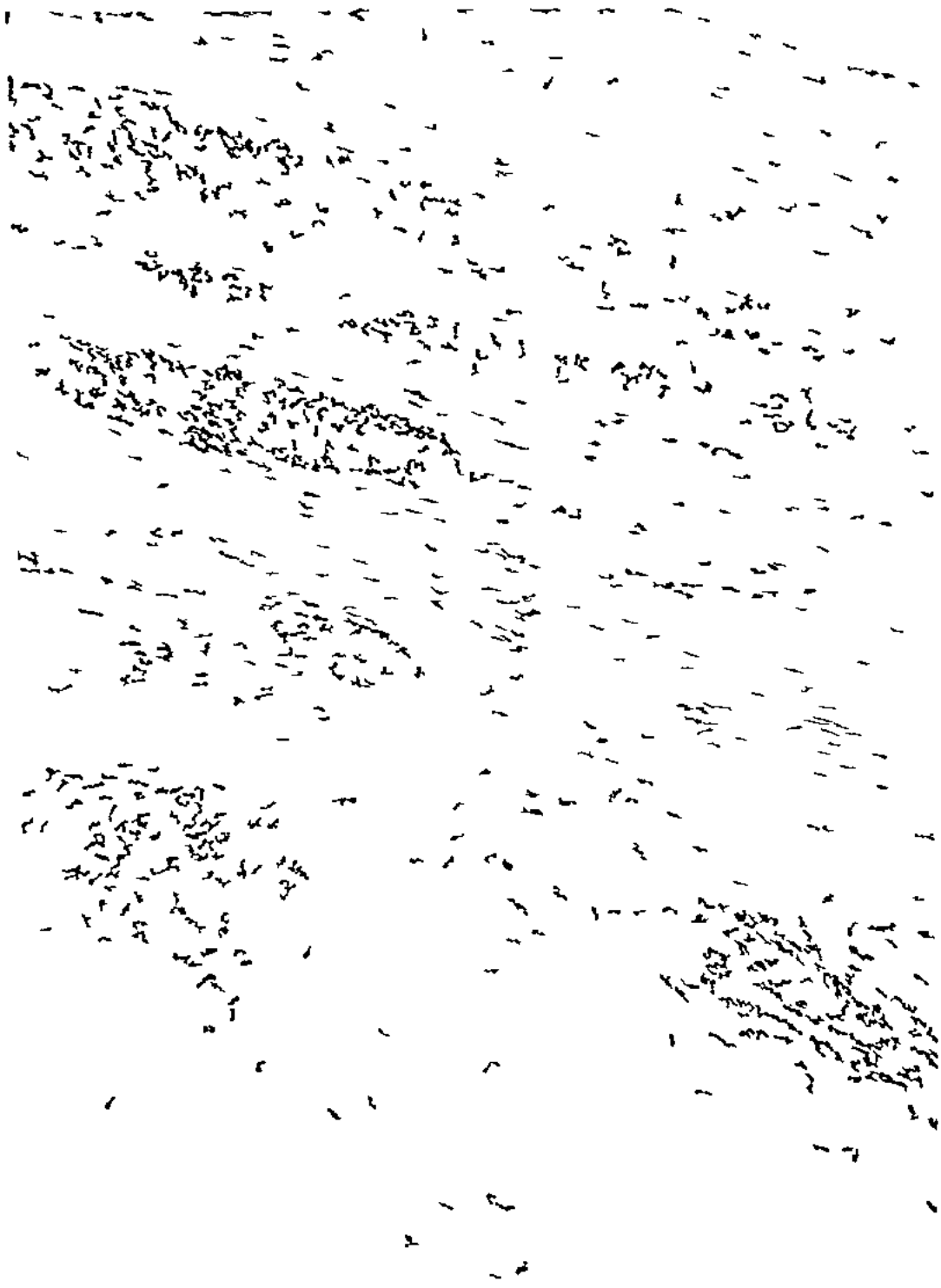
Figure 3 Probable tuberculous pleuritis—organized noncaseating granuloma.

firmed by pulmonary tissue removed at the time of surgery (figure 1) Thus in 3° of 38 cases the pleural pathology was confirma tory and the combined pleural and pulmonary tissue patholo_v



F gur 4 B d l mo gr ul m t pl ur l s—f br t lymphocyt gi t ll d f u p th li l lls. L me the d cr l nor c r cr b d.

confirmed the diagnosis in 35 of 38 cases in this series, and for an accuracy of approximately 92 per cent In three cases there was considerable disagreement negative pathologic find ings having been obtained but a final diagnosis of tuberculosis



F gur 5 Def t ly nontube culou pleuritis—no spec fic inflammato y act u th no morpholog c features s ggestive of tube c losis.

was nonetheless made These three cases will be reported in considerable detail However it would seem to us that open thoracotomy with adequate exploration should confirm or exclude the diagnosis of tuberculosis in almost all cases and it should permit us to make a valid presumptive diagnosis of no tuberculosis if the pathology findings at full thoracotomy failed to reveal any evidence of granulomatous pleuritis and no granulomas were palpable in the lung

In order further to confirm or deny the validity of the pathologic findings the slides of all 63 cases were submitted without any clinical information for review by the pathologist co author (W H H) and were classified on the basis of morphology as definite tuberculosis probable tuberculosis borderline granuloma or definite nontuberculosis according to the following criteria

Definite tuberculosis (organized caseating granuloma figure 2) A granuloma consisting of a circular or oval arrangement of tangled or palisaded epithelioid cells containing Langhans type giant cells surrounding a central mass of eosinophilic granular or fibrillar necrotic material The nodule is circumscribed by a narrow rim of loose fibroblastic or fibrous connective tissue infiltrated and surrounded by lymphocytes The presence of acid fast bacilli on appropriate staining is also considered as confirming definite tuberculosis

Probable tuberculosis (organized noncaseating granuloma figure 3) A granuloma having the same appearance as described above but without central necrosis

Borderline granuloma (morphologic commitment impossible figure 4) Irregular often fusiform collections of lymphocytes situated in fibrous tissue and associated with giant cells of the foreign body type There may be foamy macrophages granulation tissue and even necrosis Epithelioid cells are rare The lesion is neither discrete nor circumscribed by loose fibrous tissue

Definite nontuberculosis (figure 5) Mature fibrous connective tissue marked by diffuse and focal collections of lymphocytes plasma cells eosinophils or even neutrophils

Comment These criteria are based on the assumption that the disease process is still relatively recently active Completely healed tuberculous pleuritis may not differ from non tuberculous pleuritis in its histologic appearance

Table 1 demonstrates that this review within small limits of error concur with the results obtained on review of the original pathology reports It is thus felt that morphologic criteria should be quite satisfactory in separating tuberculous from nontuberculous lesions

TABLE 5 *P b l g d gno ba d on dy f d p*

	T ber ul pl ur		N d g pl ur f f d TB d g d b f d pul ary	To l p h d f TB P b- bl TB	B d l g l ur	D f TB d	Sl d l ot ly d f d	T l
	D f	Prob bl						
Or g l P h l gy po	3		3	35	0	28	0	63
R f l d b d k	2	1	5	33	3	2	1	63

N d d f prob bl

CASE REPORTS

Cases n Wh ch th M phologi DI g osi Diffe d f m the Fin l Diag os s

Case 1 A 25 year old Negro private was admitted to Fitzsimons Army Hospital in December 1952 following a spontaneous pneumothorax on the right at which time x ray revealed moderately advanced right upper lobe tuberculosis PPD No 1 was positive Sputum was positive for tuberculosi organisms on concentrate and culture from December 1952 through February 1953 Subsequent cultures were all negative Following his spontaneous pneumothorax the patient developed a tuberculous empyema on the right with pleural fluid which at first was clear and later was purulent A positive culture for tubercle bacilli was obtained from the pleural fluid on 24 February 1953

On 16 July 1953 following six months of therapy with streptomycin and isoniazid (INH) the patient had a decortication on the right for treatment of empyema No pulmonary tissue was obtained at the time of surgery The pleura revealed nonspecific inflammatory pleuritis Tissue sections smears and cultures of the decorticated pleura were all negative for tubercle bacilli

On 1 April 1954 at which time the patient had received 15 months of streptomycin INH therapy he had an excision of his sinus tract and drainage of a mixed infection empyema Again the pathology showed nonspecific pleuritis and the bacteriology was all negative

The patient was discharged on 30 September 1954 with inactive tuberculosis and at the time of his latest follow up (6 August 1956) he was clinically well and working

Review of tissue sections submitted as unknown at the time of the present study also resulted in a diagnosis of nonspecific inflammatory pleuritis and the sections were classified as definitely non tuberculosis

Comment This patient appears to represent a "clean miss" as far as the pathology is concerned He had a well documented case of tuberculosis with a positive culture of the pleural fluid five months prior to his original surgery It is conceivable that

mixed infection elements were present in this empyema which completely obliterated the expected morphologic findings of tuberculous granulation tissue Indeed this is the only possible explanation in this case Since no indication existed clinically for resectional surgery in this patient no lung tissue was removed However had this been done there is no doubt that pathologic confirmation of his pulmonary tuberculosis would have been obtained

Case 2 A 19-year old Negro female in August 1954 developed meningeal symptoms accompanied by a left sided pleural effusion PPD No 1 was positive Spinal fluid revealed 250 white blood cells with 98 per cent lymphocytes sugar 38 mg per cent protein 360 mg Cultures of the spinal fluid as well as repeated gastric aspirates were negative for tubercle bacilli No thoracentesis was ever performed

The patient was placed on intensive antituberculous therapy with immediate dramatic clinical improvement and was clinically perfectly well at the time of surgery

On 1 July 1955 the patient received decortication for residual pleural thickening with functional impairment of the left lung At the time of surgery she had received six months of triple drug therapy plus four additional months of streptomycin INH

The pathologic findings were those of chronic fibrous pleurisy Tissue sections smears and cultures were all negative for tubercle bacilli

The patient was discharged on 6 August 1955 asymptomatic tuberculous meningitis and inactive tuberculous pleural effusion Her last follow up was on 26 March 1957 at which time she remained perfectly well

Review of pleural sections at the time of the present study gave rise to the diagnosis of chronic fibrous pleuritis definitely nontuberculous

Comment In this case the presumption of tuberculous meningitis with tuberculous pleural effusion is exceedingly strong clinically even though it was never proved bacteriologically Since the effusion was part of an acute manifestation of early disseminated disease and the patient had received adequate intensive chemotherapy prior to surgery it is felt that this patient very likely had had a complete cure of her tuberculous pleuritis at the time of surgery

Case 3 A 30-year old white male sergeant had had a pneumothorax procedure at the right base in June 1953 following which he had had serial pneumothorax treatments of right sided pleuritic pain prior to his admission in June 1955 at which time he had considerable pleural thickening on the right and repeated attempts at thoracentesis were all unsuccessful

This patient had a positive PPD skin test in addition to which he had positive histoplasmin and a positive coccidioidin skin tests Serologic studies for fungi were all negative His sputum was reported as positive for tubercle bacilli on direct smear on 7 June and 8 June 1953 prior to this admission to Fitzsimons Army Hospital Both of these positive smears were subsequently reported as negative on culture A great number of subsequent sputum and gastric cultures were all reported as negative

On 14 November 1955 following five months of streptomycin INH therapy a diagnostic right thoracotomy with a decortication was done The pathologic findings were those of chronic fibrous pleuritis No evidence of granuloma was found and all bacteriologic studies were negative Despite the pathology report the patient was still considered to have tuberculous pleural effusion and was continued on chemotherapy to the time of discharge with a diagnosis of inactive pleural effusion on 26 November 1956

Review of pathologic slides as unknown during current study also resulted in a diagnosis of chronic fibrous pleuritis definitely not tuberculous

Comment This case has been classified as tuberculous because of the final clinical diagnosis However on careful review of this case we believe there is considerable doubt as to the validity of the diagnosis of tuberculosis

Two positive sputum smears with negative cultures of the same material would seem to cast doubt on the validity of the positive smear This is especially true in view of the great number of negative cultures before and since It seems quite likely that this was a case of nonspecific pleuritis arising on a postpneumonic basis and probably never was tuberculosis We would suspect that in this case the pathologic diagnosis was right and the clinical diagnosis was erroneous

On review of the three cases of clear disagreement we would conclude that in case 3 the clinical diagnosis rather than the pathologic diagnosis would seem to be in error In case 2 where the effusion was associated with an acute tuberculous meningitis it is entirely conceivable that the patient may have had a true cure prior to the time of her surgery This would leave only case 1 where there was a chronic tuberculous empyema in which we feel the pathology failed to show the expected findings It is therefore quite likely that the morphologic findings in this series were even more accurate than the 92 per cent claimed for them

BACTERIOLOGIC FINDINGS ON RESECTED SPECIMENS

Thirty five of our 38 cases with a final diagnosis of tuberculosis were shown to have had morphologic confirmation on the

basis of material obtained at thoracotomy Twenty five of these cases had some form of bacteriologic confirmation for an in cidence of 65 8 per cent Only one patient had positive tissue sections smears and cultures of the resected specimen Twelve patients had positive tissue sections and smears but negative cultures Seven patients had positive smears only with negative tissue sections and cultures and five patients had positive tissue sections with negative smears and cultures Ten patients (26 4 per cent of our tuberculosis cases) had morphologic find ings compatible with tuberculosis but no bacte iologic confirma tion of any kind and three patients (7 8 per cent of the tuber culosis patients) were diagnosed tuberculosis though pathologic or bacteriolo ic proof was not obtained from the resected spec imens These three cases were described in detail in the pre ceding section

THE INFLUENCE OF CHEMOTHERAPY ON THE BACTERIOLOGIC FINDINGS AT SURGERY

Fifty four of our 63 patients received some form of antituber culous chemotherapy prior to surgery in courses ranging from two weeks to 26 months The over all average duration of chemo therapy prior to surgery in these 54 patients was six and one half months Thirty seven patients received streptomycin INH Nine patients received streptomycin INH para aminosalicylic acid (PAS) either as triple therapy or in varying combinations Five pa tients received streptomycin and PAS Two received streptomycin INH and Terramycin in varying combinations and one received streptomycin INH PAS and Terramycin in varying combinations

In general the longer the duration of chemotherapy prior to surgery the less chance there is for bacteriologic confirmation In individual cases however there may be wide variance In our series patients were noted to be negative bacteriologically although positive morphologically after as little as two months of preoperative chemotherapy On the other hand smears or tissue sections were noted to be positive after as much as 26 months of preoperative therapy

However the average duration of chemotherapy in cases having morphologic evidence of tuberculosis without any bacteriologic confirmation was three months longer prior to surgery than in those cases in whom positive smears or tissue sections were obtained

Chemotherapy of any duration virtually eliminates positive cultures obtained from the resected specimen The only case in our series with cultural confirmation postoperatively was the single untreated tuberculosis case The specific drug regimen used does not seem to be important in determining whether bacteriologic confirmation will be found on the resected speci

men The important factor is the duration of chemotherapy prior to surgery It may also be concluded that chemotherapy per se regardless of duration or drug regimen used does not seem to alter the morphologic features significantly, so that a presumptive diagnosis on the basis of histopathology is possible in nearly all cases despite chemotherapy

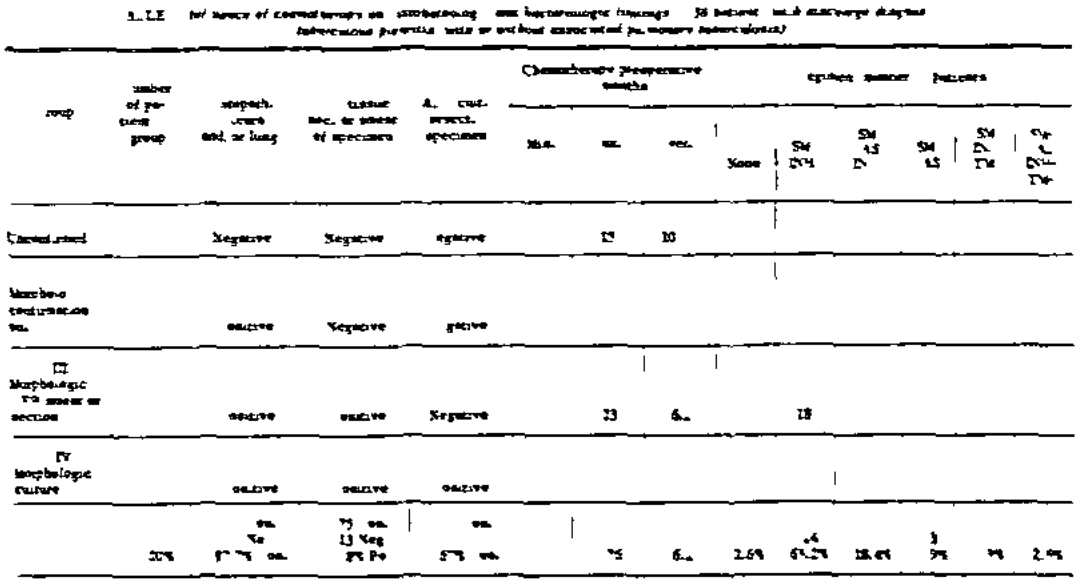


Table 6 summarizes the foregoing conclusions regarding the influence of chemotherapy on the histopathologic and bacteriologic findings in 38 patients with a discharge diagnosis of tuberculous pleuritis

FOLLOW UP DATA

The only way we can confirm that the patients given a nontuberculous diagnosis were indeed nontuberculous is by adequate follow up All 63 of our patients had had maximal benefit of hospitalization at the time of their discharge All tuberculous cases were classified as either inactive or arrested at the time of discharge In 45 cases information was available six months or longer from the date of discharge Eighteen patients were lost to follow up or no information was available six months or longer after discharge

Table 7 shows the duration of follow up in years of the 71 per cent of our patients on whom follow up information is available

All 45 of our patients with follow up data available are essentially well Most are gainfully employed None is disabled for medical reasons related to his illness None of the tuberculous patients has relapsed and none of the patients given tuberculosis clearance has developed evidence of tuberculosis since the time of discharge

TABLF 7

Y f m F m A my H p l d h g	N mb f p t t
3 3/	4
2 r3	8
2 2/	5
1 r2	11
1 1/	13
/r1	4
T t l	45 (71%)

LIMITATIONS AND I LANS FOR FURTHER STUDY

The primary purpose of this study has been to ascertain the reliability of morpholo_ic findings from tissue obtained at thorac otomy in differentiating tuberculous from nontube rculous ef fusions

While it appears to us that this seems to be a reliable method in the vast majority of cases we are well aware that certain criticisms can be leveled at a retrospective study of this type

I irst our series of 63 cases with relatively short term follow up might be considered to be too small and too premature to be of much statistical significance

Second only eight of the 25 nontuberculous patients received no chemotherapy prior to or following surgery In the remainin_ 17 nontuberculous cases the average duration of chemotherapy approximated six months It is possible that erroneous tuber culosis clearance might have been given in some of these cases but that the intensity and duration of chemotherapy were great enough to produce healing and prevent relapse We are there fore inclined to view this study as a preliminary report which would indicate the validity of our thesis rather than establish its incontrovertible truth

Pearing these facts in mind we have set up a protocol for a controlled study in cases of pleural effusion of dubious eti ology eliminating those cases that on clinical and bacterio- logic ground are definitely either tuberculous or nontubercu lous

The patients in this study are to be given a short period of preoperative dru_ covera_e followed by limited thoracotomy with pleural biopsy such as is advocated by Breckler et al The tissue obtained is to be separately labeled for examination

The incision is then to be extended and a full exploratory thoracotomy, with careful palpation of the lung and removal of specimens for examination is to be carried out All cases shown to be tuberculous or probably tuberculous on morphologic and/or bacteriologic grounds will receive full courses of antituberculous therapy

In all cases in whom the bacteriology is negative and the morphology is nontuberculous by the criteria set forth earlier in this paper all antituberculous drugs are to be immediately discontinued and the patient is to be returned to a full activity status immediately following recovery from surgery This will include returning military patients to a full duty status

All patients will be placed on a regular follow up schedule and observed at frequent intervals for a period of five years following their surgery In this manner, if we are wrong no great harm will have been done, since any tuberculous relapses in the supposedly nontuberculous group will come under prompt and adequate medical care If we are correct in our assumption there should be a negligible relapse rate in the nontuberculous group

This study will also give us an opportunity to compare the relative diagnostic accuracy of full exploratory thoracotomy versus limited pleural biopsy procedures in a large number of cases using each patient as his own control since both procedures will be carried out by the same surgeon at the same time and examined by the same pathologist using identical technics and diagnostic criteria on both specimens We would anticipate that full thoracotomy will be confirmed as showing greater reliability than does limited open pleural biopsy

Should the long term study bear out the findings indicated in this preliminary report we feel that we will have added a valuable tool to our diagnostic armamentarium which when wisely used under proper circumstances could result in considerable saving in time family hardship and expense in many instances

While we are embarking on the study outlined above it should be emphasized that we are not advocating indiscriminate use of exploratory thoracotomy in all cases of pleural effusion, but are reserving this recommendation for those cases in whom there is some legitimate doubt as to the diagnosis and in whom it is felt necessary to avoid prolonged hospitalization or chemotherapy if it can be reasonably demonstrated that the patient probably does not have tuberculosis

SUMMARY

1 In an effort to establish better criteria for the differential diagnosis of pleural effusion the records of 63 cases with pleural disease who received open thoracotomy have been reviewed

In all of these cases a diagnosis of tuberculosis either was established or was a strong differential diagnostic possibility All patients received an open thoracotomy for either diagnostic or therapeutic indications or both Thirty eight patients were given a final diagnosis of tuberculosis and 95 were given a final diagnosis of nontuberculous pleuritis

2 The tuberculin tests show positive in all patients with the final diagnosis of tuberculosis All negative tuberculins were in the nontuberculous group It is felt that a negative tuberculin test done with properly prepared solutions and repeated six to eight weeks after the onset of the effusion effectively excludes tuberculosis as the cause of a given pleural effusion However positive tuberculin tests prove nothing as far as establishment of a tuberculosis diagnosis is concerned other than the fact that tuberculosis must be considered as a possibility

3 Other skin tests such as histoplasmin or coccidioidin may add to the differential diagnostic possibilities but prove or disprove nothing in the individual case

4 The pleural fluid showed no consistent physical chemical or morphologic differences that could be relied upon to differentiate tuberculous from nontuberculous effusions Only 21 per cent of the patients with a final diagnosis of tuberculosis had positive bacteriologic findings on the pleural fluid aspirate Bacteriologic diagnosis on pleural fluid is therefore helpful only in a positive way but negative findings do not exclude tuberculosis

5 Positive sputum and/or gastric aspirates were found at least once in about 40 per cent of our tuberculous patients Frequently one or more positives were found in patients having pleural effusions with no x ray evidence of parenchymal disease Nonetheless the incidence of positive sputum or gastric findings is too low to be of differential diagnostic value in the negative sense However positive bacteriologic findings even in what appears to be pure pleural effusion are probably an indication of underlying active parenchymal or endobronchial disease

6 Full open exploratory thoracotomy in doubtful cases seems to be more valuable than does limited thoracotomy or closed biopsy technics Not only can better areas be selected under direct vision for biopsy but also significant pulmonary lesions are frequently found which otherwise might be undetected

Nine of the 95 nontuberculous cases had significant pathologic findings other than pleural either established or confirmed on the basis of thoracotomy which might otherwise have been overlooked In 10 of the 38 tuberculous cases significant nonpleural

tuberculosis was found which was unsuspected either clinically or by x ray

7 Morphologic pleural changes established the presumptive diagnosis of tuberculosis in 32 of 38 cases In three additional cases the diagnosis was established by the morphology of le sions discovered in the lung at the time of surgery Thus, mor phologic changes in the pleura and/or the lung established a diagnosis in 35 of 38 cases The additional three cases would never have been diagnosed had not full open thoracotomy with careful palpation of the lung been done More limited procedures might well have overlooked these cases

8 The three cases of disagreement between morphologic find ings and final diagnoses are analyzed in detail, and it appears that in only one of these three is there no reasonable explan ation for the disparity

9 Morphologic findings on the basis of tissue obtained at open thoracotomy are therefore at least 92 per cent reliable in the present series in differentiating tuberculous from nontuber culous pleural effusions

10 Morphologic findings are unaffected even by prolonged preoperative chemotherapy in practically all cases

11 Bacteriologic confirmation of morphologic findings by acid fast stains of tissue section smears, or cultures on re sected specimens was found possible in 65 8 per cent of the tuberculous patients In only one patient however was it pos sible to get cultural confirmation

12 The chance of bacteriologic confirmation of the resected specimen is inversely proportional to the duration of preoperative chemotherapy The specific drug regimens used do not seem to be important

13 Follow up information of from six months to three and one half years after discharge is available in 71 per cent of our cases There has been no tuberculosis relapse and no pa tient cleared as nontuberculous pleurisy has broken down with clinical tuberculosis to date

14 The limitations of this retrospective study are discussed and plans for future study and follow up of a series of patients are outlined

CONCLUSIONS

1 In cases of idiopathic pleural effusion it would appear that the best way to make an etiologic differential diagnosis of tuber culous versus nontuberculous origin is by means of an open exploratory thoracotomy with removal of an adequate area for biopsy from the involved pleura A specimen of lung should be obtained when pulmonary involvement is found

9 Morphologic and bacteriologic studies should be done on the resected specimen and should be of differential diagnostic value in almost all cases

3 Morphologic change is unaffected by preoperative chemotherapy but the chances of bacteriologic confirmation are inversely proportional to the duration of preoperative chemotherapy

4 Results of this retrospective study on 63 cases would indicate at least 92 per cent reliability of full exploratory thoracotomy in establishing a differential diagnosis of tuberculous versus nontuberculous pleural effusions on morphologic criteria

5 There seems to be a strong indication for a controlled study utilizing exploratory thoracotomy in effusions of dubious etiology Except for a short period of preoperative drug coverage in all cases antituberculous chemotherapy should be withheld in all patients who do not exhibit morphologic or bacteriologic changes compatible with tuberculosis A long term follow up study on such a series of cases would seem to be of great value

6 A five year follow up study as indicated above is currently being established at Fitzsimons Army Hospital and it is to be hoped that other institutions will do likewise

REFERENCES

1 R p W H d W g J J P mary f b no pl ur l ff m l y p l *Am. Rev Tuber* 71 616-634 M y 1955

2 C mp M A P l mmun

3 B kl I A. H l N M. H ll H E H ffm M C d H k ll P B B p y h d gn f h d *Amn. Int M d.* 46 706-719 Ap 1957

4 D h R F K S d M rth w M J A p b p y f p l pl ur ul 45 *Am. J M d.* 22 883 893 Jun 1957

5 S d W W E h h l A d S H K Op d p h l g f d g 24 p h y dr m f d p hic pl ur y w h ffus pr um bly b rc l *Am. Rev Tuber* 71 473 502 Ap 1955

TENSION

T n n not a se e e illnes nd those who s ff from t n on a e well enough t feel nd uffer fr m th cramping lf nter d mposed upon them by their psych mat c diso de They are like th lost soul who e punishment is n th word of th g eat C tholic poet Gerald M l y H pk ns to be thei sw t g sel e but wo se —Ald s Huxley Th H story of Tension (ed to ial) *The New Phy c an* May 1959

AVERAGE LENGTH OF PATIENT STAY IN DEPARTMENT OF DEFENSE HOSPITALS

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WILBUR V CHARTER *D P H*
STEVE REMIAS *M S*

Report of Task Group

During recent years as operating costs and demand for medical services have increased there has been a growing interest in management of hospitals One of the management tools used as an index of efficiency of hospital operation and for planning medi cal service needs is length of patient stay data. These data are and have been applied to establish budgets to determine staffing and even to influence size and configuration of hospital construction projects

The Department of Defense hospital system operated as a part of a world wide medical service system consists of several types of hospitals serving different population groups under widely different environmental conditions It was obvious therefore that "average length of patient stay data collected from such a variety of sources would have limited validity in reflecting efficiency of medical service management Within the Department of Defense therefore average length of patient stay data have not been accepted as a useful and reliable management tool

In general however this mistrust of such data as an over all management tool was based on intuition No critical analyses had been made from the Department of Defense viewpoint In the mean time average length of patient stay data were being used more and more frequently outside the Department of Defense to compare military and other hospital systems and to compare one military medical department with another for over all management

On 22 December 1958 we established a task group to make an intensive study of average length of patient stay data stressing methods of computations and use of such data I have approved the report of this task group published here The facts and word ing contained in this study will be the basis for use of patient stay data within the Department of Defense

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Fr m h Off f th A ist nt S cr t ty of Defe s (He lth nd Medical) The th r ar m mb r of t sk gr p appoint d t study th probl m.

It s long standing policy to practice joint u e of all m d cal fac lit and services fo maximum eff c ency and c nomy of military medical ope ati ns In implem ntation of this policy as applied to hospital op ati ns maxim m eliance is placed on officials having d ct op ation l resp ns bility In the final analysis this is the h pital commande H alone an tak the necessary pract cal steps to red e the length of pat nt stay to th mi mum cons st nt u th both prof si nal judgm t and the principles of go d managem nt Accordingly the Depa tm nt of Defens hospital management bj ct ves relat g to pat ent stay are ach ev d th o gh co t nt applicati n of our ba ic p l cy of ff c ncy and econ my down th ough th hain of operational command —Fr nk B Berry M D Assistant Secreta y of Def s (Health and Med c l)

THE concept of average length of patient stay is deceptively simple In general average length of stay is computed by dividing the total number of days a group of patients spent in hospital by the number of patients in the group The arithmetic is easy but the proper interpretation and application is much more complex As Fineberg recently stated

> The average le gth of stay i a very s mpl figure to obt in But what doe t m n nc it is calcul t d?
>
> In a gen l h spit l for example f a ton illect my c e wh ch stays 5 day a d tub rculosi case wh ch t ys 5 m ths are averaged the e ult t verage length of st y is pp oxim t ly 73 d ys—a f gure wh ch me n bsolutely noth g
>
> It s l ke a r ging the weight of man who we gh 180 pound his wif who weighs 110 pounds and their ch ld who weighs 70 p unds The r ave age we ght is 120 p unds but this figure does not d c t that the man may be ove weight his wife underw ight and the ch ld approx mately normal i we ght In th s me way th 73 d y a e ag l ngth of p tient stay in the ex mple above does t ndicate whether 5 days i to l g a st y f r th ton l lect my o 5 months too short a stay f r the pat ent w th tube cu l si
>
> Ne the hould a gro er ge length of t y figure f o e h pit l be *mp red with that of another s nc this figure can* easily be shifted in one direction or a other by the number of short o long stay cas s includ d All th fact i lved m st be c refully n d ted and properly weighted bef re th verag length of st y n g en hosp tal ca be p operly v lu ted

Much of the misuse and misunderstanding of lengtl of stay information stems from two widely current cause and effect stereotypes First if treatment is inefficient and dilatory and if there is procrastination in takin_ the necessary administrative actions with respect to the processing and disposition of pa tients the lengtl of stay will be longer than would otherwise

be the case Second, if actions are taken which result in thorough, prompt and effective treatment and in rapid and efficient accomplishment of administrative requirements, the length of stay will be lessened Both of these ideas are valid as far as they go, and to the extent that they are applicable It is not always realized that although true, they are not necessarily relevant to the particular situation under consideration All too often if length of stay goes up, the first of these stereotypes is assumed to apply and if length of stay goes down, a similar assumption is made about the second Thus, it has been erroneously assumed that the average length of patient stay can be used as a measure of the efficiency and economy with which a hospital or a system of hospitals is administered—that an increasing average length of patient stay is an indicator of lessened efficiency in operation and that, conversely, a decreasing length of stay is an indicator of improved efficiency in hospital operation

FACTORS AFFECTING LENGTH OF PATIENT STAY

In point of fact there is a host of other factors which are equally or more likely to have been involved in an increased or lowered length of stay Let us consider first the effect of an epidemic or very high seasonal incidence of acute respiratory diseases This can result in a marked overcrowding of the hospital, overworking of the staff, wasteful use of equipment and supplies and lessened efficiency in many phases of the hospital's operation Nevertheless, as a result of this inclusion of a much higher than usual proportion of short term respiratory cases in the hospital's patient population, the net effect on the computed average length of stay will almost certainly be a marked reduction On the other hand, a department or medical service may, in attempting to provide a high standard of medical care and hospitalization with the greatest possible economy, adopt a policy requiring that every effort be made to treat patients with the relatively milder diseases or injuries on an outpatient basis without admission to hospital, where this is medically feasible Although this policy will result in a saving of hospital beds and hospital costs, it will, if other factors remain constant, increase the average length of patient stay Consider the following hypothetical example If a group of 300 hospital patients consisted of 100 patients with 50 days duration each, 100 with 20 days each, and 100 with 2 days each, the total number of days lost by these patients will be 5,000 plus 2,000 plus 200 or 7 200 The average length of stay for this group will be 24 days Let us suppose that such a change in policy results in treating 80 of the 100 patients who were hospitalized for two days on an outpatient or quarters basis There will now be only 220 hospitalized patients in the group and they will have lost 7 040 days because the 20 patients remaining in the two day group will have lost only 40 days The average duration then for this group of 220 patients would be 32 days per patient Thus,

a policy which actually reduces the requirement for hospital beds for a given population can result in an increase in the computed average length of patient stay

A great many factors other than efficiency of operation have a marked and definite effect on what the magnitude of the computed average length of patient stay will be Among those which are readily and easily identified are departmental and medical service organization and policies mission of individual hospitals diagnoses and conditions treated characteristics of population served composition of patient load and proportion of nonmilitary patients Observations regarding each of these factors follow

Medical service organization and its policies both professional and administrative are important factors in the magnitude of the indexes computed for average length of patient stay To the extent that these differ from department to department the validity of interdepartmental comparisons will be affected For example the fact that a significant proportion of naval strength is aboard ship and receives medical care in sick bay undoubtedly results in there being a lower proportion of short term hospital cases than would be the case if the entire force were shore based The presumed effect of this would be to produce a higher average length of patient stay vis à vis Army or Air Force Also the Army and Air Force practice of counting as admissions all patients excused from duty as of midnight on the day of first excusal in contrast to the Navy s binnacle list system should result in a higher proportion of 1 day short term cases being included in the Army and Air Force experience with a resultant shortening of average length of stay in comparison with Navy In many cases these various factors work in opposing directions Professional policies whether across the board or on a by area or by echelon basis also exert their influence This relates to such matters as prescription or recommendation of conservative or radical treatment for pilonidal cyst or sinus and for gastric and duodenal ulcer Administrative policies regarding such questions as steps necessary to obtain orders effecting reassignment of patients ready for return to duty are also relevant Thus it can be seen that in the absence of standard organization and policies or of assurance that existing differences are of no effect in this area interdepartmental comparisons are very risky at best

Difficulties are also encountered in attempting to compare the length of stay index of one hospital with that of another The mission of the hospital is of course of prime importance Even if one confines consideration to what might appear as homogeneous hospital categories major problems still remain One might assume for example that Army Class II hospitals should be comparable in this regard This however is not the case By the time one has further differentiated on the basis of such points as troop population served for primary care types of specialized

treatment and proportion of beds authorized for each, and relative numbers of evacuee patients, it is found that the number of importantly differing groups is about the same as the number of hospitals

It might be thought, *a priori* that a comparison of average lengths of patient stay on a "by diagnosis" basis would be a simple, straightforward process raising no comparability questions Indeed, this is about the safest basis on which such comparisons can be made Even here, though, there are questions Apart from the general consideration of the age and sex distribution of the patients in the compared groups there is the matter of the complicated and more difficult cases of a particular condition tending to be transferred to the specialized treatment hospitals or centers for care Proper allowance must be made for this Also, technical differences exist in the manner of charging and tabulating days lost on a "by diagnosis basis among the military departments Whereas in the Army processing the total days lost in the episode of treatment are shown both for sole and for multiple diagnosis cases of the condition involved, in the parallel Navy operation the patient is carried under only one diagnosis at a time insofar as chargeable days are concerned, a selection being made as to the most significant of multiple intercurrent conditions Also, the proportion that each diagnosis contributes to a given patient load will importantly affect the computed length of stay

The population served by a military hospital, its characteristics in terms of length of service and age distribution, will have a pronounced effect on the average length of patient stay A hospital serving a population of recruits or unseasoned personnel is likely to have a relatively low patient stay index because of the comparatively high incidence of acute respiratory disease and the acute childhood type communicable diseases likely to be encountered The average length of stay for all patients treated in the hospital will be much affected by the proportion of non military patients included in the total load A high proportion of dependents for example with large numbers of obstetric cases and tonsillectomies will tend to produce lowered indexes of length of stay

INTERPRETATION AND USE OF COMPUTATIONS

The proper interpretation and use of computations of average length of patient stay is very complex The use of a standard formula for derivation of this index would provide no assurance whatever that the indexes so derived were in any way truly comparable Lengths of stay may be properly computed on a number of different bases depending on the purpose for which the index is to be used For example, it may pertain to the total period of hospitalization, that is, to the time elapsing between the date of admission and the date of final disposition of the patient It may relate only to the period between these dates during which

the patient was occupying a hospital bed It may relate only to that portion of the duration of stay of a transferred case which was spent in one of the hospitals in the evacuation chain or it may relate to the days spent in a specified segment of the hospital system as, for example in the Army Class II Hospitals

The average length of patient stay may be computed in several different ways which depend in part on the nature of the source data upon which the computation is based For example it may be derived from individual patient records or from summary statistical reports In the former case it may be computed on the basis of the days lost by patients of whom disposition is made within a specified time period for example patients disposed of in calendar year 1958 or it may be based on information pertaining to patients admitted in a given time period followed through to ultimate disposition as might be the case where the purpose was to study the effect on duration of a new type of therapy instituted during the period in question If derived from summary report data it may be accomplished in several different ways with a greater or lesser degree of detail and precision depending on the purpose for which it is to be used In the light of these factors it is believed that it would be undesirable to attempt to establish or prescribe any single method of computation of *duration of patient stay* *Requests for information of this kind* should be explicit as to the purpose and type of duration information required so that data prepared in compliance with such requests is derived in a similar and comparable manner The instances in which general information on duration of stay may properly be used are so infrequent that any action which tended to encourage such use would probably be more harmful than helpful

Data on average length of patient stay have certain specific appropriate uses For example in operational planning where one starts with assumptions as to strengths or population served and admission rates it is necessary to use length of stay data to develop estimates of bed requirements Also when policy changes are instituted regarding matters which directly affect duration of stay subsequent experience on average length of patient stay will be monitored to ensure that changes observed in the index are compatible with the proper implementation of the changed policy Examples of such policy changes are modification of the processing of physical evaluation board cases marked restrictions in the use of certain types of radical therapy and major changes in the evaluation policy between treatment echelons In this specialized situation deviations will provide a clue to areas requiring further investigation

METHODS OF COMPUTING AVERAGE STAY

The basic method of computing the average length of stay of hospitalized patients consists of collecting information on a

sizable number of patients and, after final disposition of all these cases has been accomplished totaling the actual number of days lost by these patients and dividing this aggregate number of days by the number of patients involved This quotient is the average duration of hospitalization of the group of patients studied Sometimes this is done with a group of cases that represent all of the dispositions within a particular time period at other times a cohort of cases (for example, admissions in a particular year) may be followed through until final disposition In either case, the computation cannot be made until some considerable time after the period when the operating conditions, which governed at least a part of the duration, were in effect This basic method of computation requires the use of individual medical records

Another method of computation which permits information on average length of stay to be made available on a current basis makes use of data reported on medical statistical summary reports Although summary report data do not permit one to follow patients admitted in a particular period through to final disposition they do provide the basis for a reasonably good estimate of the average length of stay of patients for the particular period

The summary report method of computation relates the days lost in the period of observation to a derived number of patients assumed to have lost those days and whose average duration is assumed to be representative of the period studied

Some of the days lost however are lost by patients admitted before the beginning of the period under study who are carried on the report for the period immediately preceding the period under study as "on the patient census" "occupying beds," or both Also as of the close of the period under study final disposition will not have been accomplished for all of the patients admitted during the period consequently some patients will be carried as in the patient census or occupying beds or both at the end of the period under study In order to take account of this situation it is necessary to make an adjustment in the number of admissions during the period

To determine the required adjustment to the number of admissions during a given period of time one must make three basic assumptions

Assumption 1 Except for magnitude the separate groups of patients either "on the census" or "occupying beds" at the beginning and at the end of the period are alike within their respective groups in regard to everything which affects days lost This amounts to saying that each patient who was remaining at *the beginning of the* period and who is matched by a patient admitted in and remaining at *the end of* the period can be disregarded because the number of days which can be contributed to the assumed days lost will be offset by a corresponding

A full list would be several times this length inasmuch as many of the types specified may be cross classified by other types For example almost all of them may be computed on a days on census or days of bed occupancy basis Many of them may be computed on a world wide United States or overseas basis Many of them may be computed on an all patients all military patients patients of specified military departments nonmilitary or specific type of nonmilitary patient basis Each of them may be on an all causes a battle casualties only or a non battle causes basis in time of war Each different type of length of patient stay index requires either a special variant of the general length of stay formula or a special instruction for the source of the elements included in the formula The use of variants specifically tailored to the purpose at hand should be encouraged It should of course be understood that the different types of indexes will vary widely in magnitude For example, in 1958 for Army patients treated in hospitals in the United States the average number of total hospital days per patient was 50 for those treated in TSG Command Hospitals (Class II) 11 for those treated in Army Command Hospitals (Class I) 30 for those treated in Air Force and naval hospitals and 20 for all military hospitals

COMPARISON WITH CIVILIAN HOSPITAL EXPERIENCE

Duration of stay in military hospitals cannot properly be compared to data on length of stay in civilian hospitals There are very real and very important differences between hospitalization in the military and civilian situations Contagious diseases occurring among military personnel require isolation (and therefore hospitalization) in order to prevent further transmission of the disease In civilian life many of these patients can be treated at home Inasmuch as the housing of military personnel is usually under barracks or field condition hospitalization is often indicated for the protection and well being of the patient as a substitute for the home care not available to most military personnel In civilian life even for those cases hospitalized the period of hospitalization is generally limited to the middle period of most acute illnesses and is preceded by a period of prehospitalization care and followed by a period of posthospitalization care at home neither of which is included in the duration of stay in civilian hospitals The conditions of military life (barracks quarters et cetera) are such that patients must be retained in the hospital who could as civilians be returned from the hospital to their home for a period of convalescence prior to actual return to full activity

SUMMARY AND CONCLUSIONS

The basic method of computation of average length of patient stay that is the division of an aggregate of patient days by the number of patients losing those days is universally under

stood and accepted and no formal standardization action is believed to be necessary

Beyond this, the number of valid and useful kinds of specific measures of length of patient stay is so large and of such variety that standardization is not considered feasible or desirable Official standardization of a limited number of those indexes might tend to give these particular measures a special status which would lead to their being used in situations where a different index would be more appropriate and useful for the purpose

General purpose use of indexes of length of patient stay should be discouraged because of the rarity of occasions on which such use is justified The use of measures of the average length of patient stay on either a current comparison or trend basis as an index of efficiency of hospital operations is fallacious and should be condemned Specific and *ad hoc* use of indexes of length of stay suitable to the purpose and circumstances of their application should be encouraged

Requests for information relative to average length of patient stay should be sufficiently explicit as to reason and intended use to permit selection of the type of patient stay index most appropriate and informative for the purpose Data provided or published on average length of patient stay should be labeled and described in sufficient detail to permit proper informed use and evaluation

REFERENCE

1 Fi b tg M. H. In c l l t g v r ge l gth f p tı t stay the *right* never m y h the wr ng m ing *Hospit l* 32 39-40 J n 1 1958

PREPARATION FOR SURVIVAL

With our modern weapons of unprecedented destructive power which give offense the predominant role we must realize that in unlimited thermonuclear war decisive blows will be struck at the very outset Within a few moments of this occurrence the medical profession will be called into action If we are unprepared our accomplishments will be dispersed uncoordinated and too often futile If we are prepared with good programs good planning and good organization much may be accomplished even in the areas of devastating destruction and our means to protect human resources and rehabilitate our population will be greatly enhanced The surviving population is the most valuable asset in any economically developed country —Frank B Berry Mass Casualty Planning and Management *North Carolina Medical Journal* October 1958

Acute Posttraumatic Aneurysm of Radial Artery

FRICH A EVERTS-SUÁREZ *C pt s MC USA*

ANEURYSMS of the peripheral arteries are uncommon [1] In general they can be classified into congenital and acquired Congenital aneurysms are extremely rare Acquired aneurysms may be divided into those caused by trauma and those which are the result of degenerative disease Traumatic aneurysms can be subclassified into true and false aneurysms True aneurysms have arterial muscle elements as an integral part of the wall False aneurysms have a fibrous capsule forming their wall Aneurysms also may be classified as traumatic mycotic or spontaneous in origin Traumatic aneurysms may be either acute (those developed rapidly following trauma to a vessel) or chronic (those due to repeated or continuous injury to the artery) The patient reported here had an acute posttraumatic aneurysm of the radial artery

CASE REPORT

A 20 year old Negro entered Carlisle Barracks hospital because of a pulsating mass on his right forearm Three months previously he had been stabbed in this arm with a knife Two weeks after the injury he noticed a swelling beneath the skin immediately adjacent to the scar The mass had gradually increased in size

Physical examination revealed a blood pressure of 130/70 mm Hg with a pulse rate of 84 per minute The neck was supple without adenopathy and the thyroid was normal The lungs were clear The heart was within normal limits The abdomen and genitalia were normal There was a 3 by 3 by 3 cm soft pulsating mass over the radial artery at the junction of the middle and distal third the volar surface of the forearm A systolic murmur was present over the mass The radial pulse was only barely felt at the wrist when the radial artery was compressed above the tumor A good right ulnar pulse was present No circulatory or neurologic changes were noted distal to the aneurysm The results of laboratory studies were entirely negative No roentgenographic examinations of arteriograms were performed

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F S d L S A my M d I L b y F G g G M d Md D E S S M y H p l Ph l d lph P

Surgical excision was advised and performed Under general anesthesia a 10 cm incision was made over the tumor and the radial artery A tourniquet was placed superior to the aneurysm and a bloodless field was produced Tapes were placed around the artery above and below the mass and the aneurysm was dissected free from the surrounding structures The aneurysm was found to arise from the medial side of the radial artery An end to-end anastomosis of the radial artery was performed after removing a small segment of the artery containing the aneurysm The anastomosis was performed using a continuous suture of 6-0 black silk After determining that the anastomosis was patent the incision was closed in layers The postoperative course was uneventful and at the time of discharge the patient had excellent radial pulse distal to the anastomosis

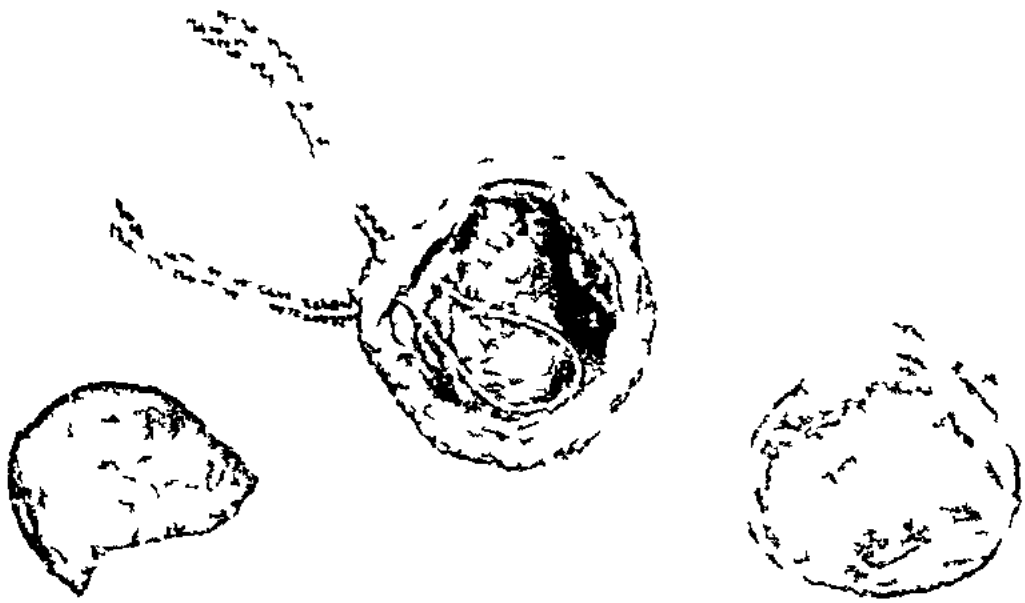


Figure 1 Bisected aneurysm. Note tying suture through proximal and distal section of artery

The specimen removed at operation consisted of a mass that measured 2 5 cm in diameter It was yellowish brown in color In the lateral side of the mass there was a portion of an artery that measured 1 cm in length by 0 3 cm in diameter A cotton string had been inserted through the arterial lumen (fig 1) It communicated freely with the lumen of the aneurysm and opened to the exterior The aneurysm contained laminated clotted blood in the lumen The aneurysmal wall measured between 0 1 and 0 2 cm in thickness and was gray brown in color The aneurysmal sac appeared to form part of the medial wall of the radial artery

On microscopic examination the wall of the aneurysm consisted of a thick external layer of fibrous connective tissue and an inner layer of vascularized loose connective tissue adherent to which were fragments of clotted blood (fig 2) Moderate amounts of hemosiderin pigment were

Officers Certified by Specialty Boards

The ur ..eneral of the military medical services have announ t ollowing re,ular Medical Corps officers have been c t i l t specialty boards indicated

\ ic an Board of Anesthesiolo,y

H S USA

c ican Board of Dermatolo,y

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n Board of Internal Medicine

LSN R s b g Eug A M J USA

n hoi asc lar Disease

Cast o te ology

E N

r l of Obstetrics and Gynecolo,y

J N

i n Board of Ophthalmolo,y

l SA L h R bard K C p MC USA

Ar cricar Board of Orthopedic Surgery

h L d N USN K p l M l C. Cap MC, USN

Al ert an Boaru of Pediatrics

Af C C L A B ll g Cl ud N J C p MC USA

American Board of Radiolo,y

C m MC L J W rt ll S ph J M J USAF (MC)

clear M d ct

C MC U A L w G I C mdr MC USN
C ll h C p C USA

American Board of Surgery

G R b rt I L MC USN H d War S P Lt C l MC USA
G R h d E M J MC USA Wh l y J ph L C mdr MC USN

Tho acic Su gery

W d l D C p MC USN

American Board of Urolo,y

G d M ur J M J MC USA

NAVY NAMES CAPTAINS ANDREWS, HOLLAND, AND RIGGS FOR PROMOTION TO FLAG RANK

Three senior Navy Medical Corps captains James L Holland Cecil L Andrews and Cecil D Riggs were recently selected for promotion to flag rank They will receive their appointments as rear admirals as vacancies occur



Capta n R ggs



Captai Holland



Captain And eu s

Captain Holland senior medical officer of the taff of the Commander Naval Air Pacific is a 1930 graduate of Vanderbilt University School of Medicine During World War II he served as a medical officer aboard the U S S *Indianapolis* and later the U S S *Essex* He was designated a flight surgeon in 1943 and is a former commanding officer of the U S Naval School of Aviation Medicine

Captain Andrews commanding officer of the U S Naval Hospital St Albans New York was commissioned in 1930 following his graduation from Indiana University School of Medicine He was awarded the Purple Heart Medal and the Bronze Star Medal with combat V for service as a medical officer aboard the U S S *South Dakota* in 1944 He is a former director of the professional division Bureau of Medicine and Surgery

Captain Riggs commanding officer of the U S Naval Hospital Chelsea Massachusetts was awarded the Navy Cross during World War II for outstanding service as a flight surgeon at Pearl Harbor during the Japanese attack During the Korean conflict, he received a letter of commendation and the Bronze Star Medal for meritorious service A 1930 graduate of the University of Louisville School of Medicine Kentucky he was formerly stationed at the U S Naval Hospital Bethesda Maryland

CAPT SILLIPHANT RETIRES IS SUCCEEDED BY COL TOWNSEND CAPT FULLER NEW DEPUTY

Captain Willi m M S ll ph nt MC USN who wa succeeded on 1 August s d rector of th Armed Force Institut of Pathology by Colonel Frank M Townsend USAF (MC) etired f om the Navy th m nth fter m e than 29 y s of act e rvice H will join the taff of the C ncer Rese r h In t tute nd D partment f Pathology of th University of Cal forn Med cal Cent n S Franc co



C pt S ll ph t



C pt F ll

Capt in R ger H F lle MC USN is the new N vy deputy dire t r f AFIP A 1938 gr duate of Tufts U iversity Sch ol of Medicin h entered the Navy in 1942 nd recently erved a patholog t at the U S Na al Hospit l C mp Pendleton Califo nia He was cert fi d in path logy in 1949

Capt in S lliph nt was c mmission d in the Navy in 1930 after h s gradu t n from Stanford Uni ersity School of Medicine He was o duty in the Philippine Isl nd at the outbreak of World War II and was n terned by the Japanese for 37 months In 1947 he b c me director of laboratorie and execut ve officer at the U S Naval Medical Sch ol Bethesda Maryland H w s appoint d Navy deputy d rector of AFIP in 1952 d bec m direct r in 1955

Colonel Townsend the f st Air Forc officer to bec me director of AFIP has been deputy d ector since 1955 A 1938 g aduate of Tula Un ty School of Medicin he h been a faculty member of W h ngto Un v ty Scho l of Medicine the Univers ty of Nebraska Col lege of Medic a d the Unive sity f Tex s Medic l Br nch In 1951 h e t bl sh d the first Air Fo ce histopathology cent r at L ckland A F B Tex

1959 MILITARY SURGEONS' MEETING TO FEATURE DOD COLOR TV PRESENTATIONS

Dedicated to the theme Practice of Military Medicine—Broadening Concepts the 66th annual meeting of the Association of Military Surgeons of the United States at the Mayflower Hotel Washington D C 9 11 November 1959 will be highlighted by closed color television programs from various Department of Defense medical research centers according to an announcement by Major General Harold H Twitchell USAF (MC) president of the society



General Twitchell

The Scientific program of the meeting arranged by a committee under the chairmanship of Colonel Frank M Townsend USAF (MC) director of the Armed Forces Institute of Pathology will include a group of noted civilian and military physicians Colonel Aubrey L Jennings USAF (MC) is general chairman of the meeting

The closed color TV program arranged in cooperation with Smith Kline & French will include a presentation of military medical activities at Andrews Lackland and Patrick Air Force Bases the new U S Air Force School of Aviation Medicine Brooks Air Force Base Texas the Armed Forces Institute of Pathology and the Aero Medical and Arctic Aeromedical Laboratories Following is a list of speakers and their subjects

Monday 9 November 1959

B d Co t

Op ing Ce em l

P l of Su ge s G n al

Th Health H lx n—*Austi M Smith M D* President Pharmaceutical Manuf cturers Association

K wledge of N w r Re pirototy Vi s—*Robert M Chanock M. D* Laboratory of I f tious D s ases National Inst tutes of Health B thesda Maryland

P e t and F t e Pr bl ms i VD Control—*William J Broun M D* Chief VD Br ch C mmunic ble Dis ase Center U S Public Health Service Atla t G orgia.

Th D g f F ll A ld i M ltl lt mi P p tl —*L t t C l l*
W ll m H Cro by MC USA W lt R d Army I f R h
W h gt D C

Tu sday 10 November 1959

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P tl thw t M D Ch f Surg al S V an Adm n t
H p l Durh m N h C l

Chongl g C pt f N t ltl F ll w g S bt t l G t t my—*J b M*
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Cl d Cl it C l T l i P g m—O g ing f m Andr w Ai
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W dnesday 11 Nov mber 1959

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H p t l El P T and M *J P H L g J MC USA* Ch f
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L d y MC USA D f M d l R ar h U S A my Ch m l
Warfar L b t e Army Ch m l C t Maryl d

Th Y E p w th l t i T tm t d R y U t l M d
l d S g y—*C pt L u L H y MC USN* Ch f f Surg y
U S N al H p l Ch l M h

Th U f R d l t p i M dl l P tl —*C pt Elm R K g MC*
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Cl d Cl it C l T l i P g m—O g g f m A d w Ai
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COL BRAMLITT APPOINTED SECRETARY OF AMA COUNCIL

C l l Ch l H B mlitt USAF (MC) wl o retired 31 J ly a depu
ty d f p t l serv ces f r the Ai Fo ce surgeon genet l
ft m h 20 y ar f m l t ry ser ce h s b amed to cce d
Th m H ll Ph D c t y f the C unc l on Sc ntif c A
embly f h A M l l A t

NEW USAF DEPUTY DENTAL CHIEF

Colonel Maurice C Harlan USAF (DC) director of dental services division at Gunter Branch U S Air Force School of Aviation Medicine Gunter Air Force Base became deputy assistant for Air Force dental services on 1 July He will serve as assistant to Brigadier General James S Cathroe USAF (DC)



Colonel Ha lan

A 1933 graduate of the State University of Iowa College of Dentistry Colonel Harlan entered active duty as a reserve dental officer in 1936 after three years of private practice and received a regular Army commission the same year During World War II he served at Billings General Hospital Fort Benjamin Harrison Indiana and as dental surgeon of the 199th General Hospital Camp Ellis Illinois accompanying this unit to France In 1945 he was ordered to Davis Monthan Air Force Base Arizona as chief of dental service

Following a postgraduate course in periodontia in 1948 at Tufts Dental College Colonel Harlan became dental surgeon at Valley Forge General Hospital The following year he was transferred to the Air Force From 1950 to 1952 he was dental surgeon of Elmendorf Air Force Base Alaska and later command dental surgeon of the Alaskan Air Command He served as dental surgeon of McChord Air Force Base Washington from 1952 to 1955

DR SHERMAN NAMED NEW ASSOCIATE EDITOR

Dr May Sherman former medical writer for several leading pharmaceutical companies and an editor of the *Atlas of Tumor Pathology* sponsored by the National Research Council and the Armed Forces Institute of Pathology has joined the staff of the *U S Armed Forces Medical Journal* as associate editor For the past two years she has been chief of the analysis and reports section of the grants and training branch National Heart Institute Bethesda Maryland A 1941 graduate of the University of Buffalo School of Medicine Dr Sherman holds bachelor s and master s degrees from Brown University She is a diplomate of the American Board of Pathology and of the National Board of Medical Examiners a fellow of the College of American Pathologists and a member of Phi Beta Kappa and Alpha Omega Alpha

OFFICIAL DECORATIONS

The following awards were recently announced by the De partments of the Army Navy and Air Force

Le_ion of Merit

Th d E F h C l USAF (DC) Harry G M l y C l USAF (MC)
Ol F M ll y M ; G USAF (MC)

Soldier s Medal

L yP W F h C pt USAF (MC)

Bronze Star Medal with Combat \

J E K kl gh Lt (; g) MC USNR

Army Commendation Ribbon with Metal Pendant

L G Al d J C l MC USA W ll m J T ff y J L C l MC USA

Navy Commendation Ribbon with Metal Pendant

Arthur H F Lt MC USNR

P h m us ward
Se d k l af l t

DEATHS

HOPPER Edw d B d C p MC USN f P h N w Y k
g d U S N l S pply C O kl d C l f m g d t d
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LOWE D S N ; AMSC USA f M mph Ten g d
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Army f h U t d S t 22 Mar h 1943 mm d p th
U d S Army 17 Jan ary 1918 d d 30 Jun 1959 g d 49 F t
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f m g d h U S N l H p t l Ph l d lph P yl
g d d 193 f m h S h l f N g Ch ld H p l B
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17 Ap l 1943 p d f d ty 11 Jun 1943 d d 11 J 1959
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CORRESPONDENCE

LETTER FROM LAOS

Dr Th mas Dooley a former Medical Co ps officer in the Naval Reserve uas a pr min nt participant i the Navy s operation Pa sage to Freedom in which r fugees wer vacuated from North to South Viet Nam ahead of the Commu ists In 1956 after completing his residency in orthopedics he re turned to the Far East as a civilian physician for the International Rescue Committee and later for Medical International Cooperation (MEDICO) The cl nic described in this l tter is the third he has organized. Already award d th L gion of Merit and Viet Nam s highest award Officer de l Ordre National de Viet Nam *for his work with refugees in Viet Nam Dr Dooley s acc mplishments will again be ecognized when he returns to the United Stat s later th s month to receive the Criss Award mad by Mutual of Omaha for s vices in the field of health and/or safety This awa d was made last three yea s ago t Dr Jonas Salk. D Dooley has desc ibed his experie ces in the Far East in two bo ks The first of these* Deliver Us From Evil *pub lished in 1956 is ab ut his wo k in Viet Nam whil* The Edge of Tomorrow *publi hed last summer by Farrar St aus and Cudahy Inc describes his work i L s*—Editor

Muong Sing June 3 1959

Dear All of You

It has been a long time since I ve been able to get a letter off to you But you are in our thoughts and our work each day Whether we are sticking a lollypop in a child s mouth or a penicillin needle some where else we remember who makes it possible for us to be here In America this is the time of lilacs In Laos it is the nyamfon or monsoon season a time of crashing violence The rains lash the trees and whip the thatched roofs The winds wail down the valley and the palms bow like acolytes at the confiteor Last month the tropical night merely whispered now it roars with fury The earth is flooded Nyamfon

Only occasionally can airplanes land on the sodden strip so we are more isolated than ever before But the isolation is only physical nothing more We feel the power of your prayers and know your help all of the time I hope you can hear the echoes of our thanks Our time goes past fast minute by second and most by more We are busy all day and much of the night Our hospital is small to be sure but then things don t always depend on size (or a cow would catch a rabbit) The new ward building ha mat space for 24 patients though in an emergency we could squeeze in a few more The Lao Woman s Association down in the capitol sent us 100 blankets for the ward while other Lao organizations sent us the cement and metal used in the building The three buildings on the compound are connected by thatch ed covered walkways that we call rain ramps This is so we can go from the house to the clinic and ward without getting drenched

E rl Rhine and Dwight Da t w rk long and ha d Thei s is a simple guide the be t way to ch e one s own h ppiness is to strive for the h ppi ss of others They c ll the old w ther d gals young m iden and the kids are Mr Bigg r Fyes Th n Mine or more mod estly Tex Ea l a d Dwight h m ged t introd ce two n w phra es i to the m unt in vocabulary Every kid n the valley can s y O K Bud a d Com n The b y ha e fo nd an anchor stro ger than the earth and mo The anchor of the human h a t They m y n t h ve yet m tered L o they ha e not yet l arned all about m d cine but th l ng age of th ir comp ssion understo d by ll po r fo th it u conscio eloquence They give much and do n t know that they g ve t all

W h e a little l d t the ho pit l named Gun Tar He is a Kha Kho from over the hills near north Burma He was badly mauled by a tiger a d the flesh of his left leg hideously mangled We repaired it pumped n antibiotic vitam ns nd protein and he is laying down new tissue lr ady Th ugh he will h ve some pretty horrible scars I think he w ll r gain 80 per cent function Hi hill dialect s the hardest of all It ound to us (and the Lao too) like a serie of grunts and yelps B t Gun T r speaks mo with hi eyes than with his mouth His eyes s y grateful things

Th Chi bord r just o er there is a constant r minder f the ulcer of evil that gnaw at the whole free world Although refuge s c ot escap as freely now those wh com tell u of the soggy clump ng sou d of commun st m ter alism Th hated Comm nes are still in force Th b sic unit of G d s mankind the family has been torn into m ny p eces Husband live n one bar cks wives n another children in another v llage cared fo by th ldsters Though the southern tip f the Moung Sing valley wh re we li e can sometimes b a g e n Shangri La glor u in its n tur l beauty the northern t p in Ch s mal gn nt shadowla d glori s in nothing Filled with g ny

Th ubstat ns of our ho pital in th sur undi g villages are being run by o r L o m litary graduates Though their work is amateurish by Amer n t nd ds they do h ve talent nd r raisi g the health of th ir r pect e v ll ges The e inten e new c rpsmen are sp rkling nd cl n Th y e ery proud of the r newly acqu red knowledge They see meh pe h yat e rywhe e they m st pos ess micro copic v s o t b ble to s e germs o re d ly We pre e tly have nine student nd E l the r p fess The stud nts are learning and Ea l is surv ving Und the ircum tances b th of these f cts are am zi g

In Ward B w h a 7 ye Thai Dam tribes boy n med Tao Koo He had a sc rch g f e se ral months ago Accompany ng it was se ere diarrh Th f m ly p t him t bed a d I suppose the vill ge w tch doctor inca t d mething or ther Within tw we ks on a diet

of rice and water the child developed a bed sore Within a month this had spread until all the flesh from his lower back and buttocks had sloughed off Over each bony hip he had a dirty ulcer He became incontinent and this constant soilage only worsened things He shrank and withered until he was just the shadow of a child Finally the father brought him to us in Muong Sing a 3 day walk Earl and Dwight immediately took the kid to their hearts And lucky is that boy Tao Koo They took that little unnoid glob of flesh and washed him with all the tenderness they could muster With the hearts of men the hands of women and a little of the mystery of God they gently scrubbed his sores treated and dressed them The child showed no reaction He was too sick too dulled by pain to respond even to this new compassion They rigged a special bed for him tying balloons across the cross bars They pasted pictures to the wall alongside it They gave him a color book and a little rabbit that squeaked On the few days that we have sunlight they bring his bed outside and drape a mosquito net over it The dressings are removed and the sores aired in the sunlight About a week after admission Tao Koo s eyes so bleak with dying began to brighten a little His terrified father learned how to treat him how to feed him properly bathe him and turn him without injuring what little good tissue was left The boys rigged a method so his incontinency would not soil everything This wee little lad God s compromise between flower and dung and sorry between birth and death once again began to live He began to smile He would answer questions with a word instead of a whimper The emaciated skeleton with withered skin is now picking up weight filling out and his sores are closing up He is happy, and definitely the cleanest boy in Asia

From this table where I m typing I can see the ward The evening is just setting and the boys are putting Tao Koo s bed back in the ward for the night There is an immense quiet happiness in the far eyes of two Americans There is peace in the faces of the Asians around the compound There is much beauty in the purple glow of the sun over the Burman hills

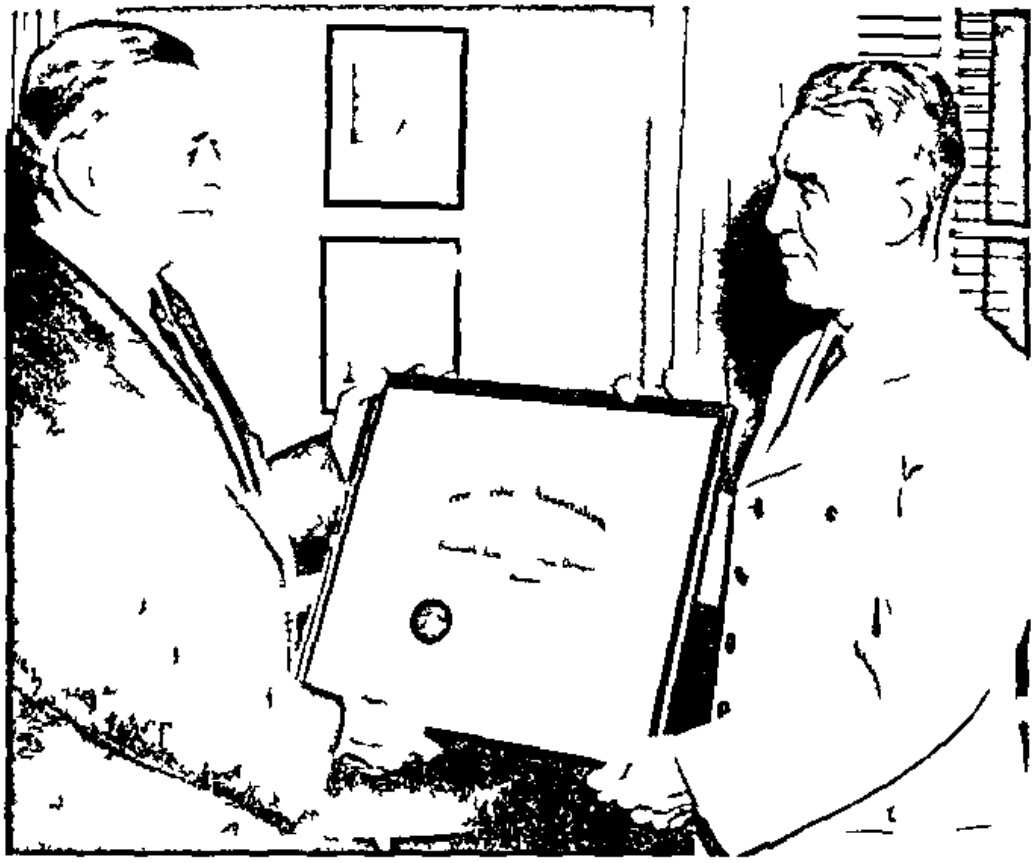
There is an extraordinary amount of terrible experience here, and agony and choking futility and much loneliness But there also are moments like this when the chaos and sadness of the day fade into a peaceful silence of the night My mind can embrace much in the clasp of memory I remember that my teachers told me Humanity is God s love on earth It remember that a doctor s job is to cure sometimes to relieve often to comfort always I remember the strong sense of friendship feeling with you I remember your constancy in suffering My boss I remember reading Lincoln freedom is for all men in all lands everywhere and remember just why we are here And in watching the flame of life flicker for that little wisp of a lad I am positive of the human spirit to rise supreme that man can develop the feeling of oneness with all

men All be ngs of bl d and breath re br the he e t help ne another

Maybe th dream f An F k cl r th n w know Thing w ll change and m n b c m g od g n and the p tiless d ys w ll come to an end a d th w rld w ll know once more ord r rest nd peac

So l ng fo now

TOM DOOLEY M D



HONORARY MEMBERSHIP The Hon able Jam s H D gla (l ft) Secretary f th A r F c t pr nt d with a cert ficate of hon a y member h p n th Aer p c Med al A oci ti by Majo G neral Ol er K Nie USAF (MC) A r Force Surgeo General The A r sp Med l A tion (form rly th Aero Medical As oci tion) annu lly elect tw h or y memb rs f o tst nd ng co tributio s t th d c m t f t s Lieuten t General Elwood Que ada AF (Ret) dm t t f the Fed al Avi tio Agen y was s m larly h d h s v

Progress Notes

Captain **Clifford P Phoebus** MC USN reported recently to the Bureau of Medicine and Surgery as director of the new Astronautical Division He attended the Naval War College Newport Rhode Island prior to this assignment Colonel **Samuel W Caldwell** MC USA who recently received a master s degree from the Harvard School of Public Health has been assigned to Ft Bragg North Carolina as chief of the hospital s preventive medicine division Following his graduation in June from a command and staff procedures course at the Army Medical Service School Fort Sam Houston Texas Lieutenant Colonel **Paul M Gowan** DC USA was appointed deputy dental surgeon of the Fourth Army

Brigadier General **Henry R Syndenham** DC USA since 1957 chief of the dental service at Letterman Army Hospital San Francisco assumed his new duties as director of dental activities at Brooke Army Medical Center Fort Sam Houston Texas on 1 September He succeeds Brigadier General **Dale B Ridgely** DC USA who retired 31 August after more than 30 years active duty The Bethesda (Md) chapter of the Junior Chamber of Commerce on behalf of the national organization recently presented a distinguished service plaque for outstanding professional and scientific accomplishments to Lieutenant Commander **Jeno E Szakacs** MC USN Lieutenant Colonel **George F Rumer** MC USA has been assigned director of the Department of Military Medicine and Surgery of the Army Medical Service School Brooke Army Medical Center Captain **Arthur R Frechette** DC USN has been elected to the Standing Committee on Civil Defense of the American Association of Dental Schools

Colonel **Louis S Leland** MC USA recently was appointed surgeon of the U S Army Japan and commanding officer of the U S Army Medical Command Japan succeeding Colonel **Charles H Moseley** MC USA who was reassigned to the Army Medical Service School Brooke Army Medical Center Fort Sam Houston Texas as head of the department of preventive medicine Colonel Leland has served as commanding officer U S Army Hospital Camp Zama Japan since 1957 Captain **Hector J A MacInnis** DC USN district dental officer First Naval District Boston Massachusetts retired recently after 32 years of active duty Captain **Robert O Canada** MC USN formerly at the U S Naval Hospital Oakland California has succeeded Captain **John B MacGregor** MC USN as chief of medicine U S Naval Hospital Bethesda Maryland Commander **Richard R Blackwell** DC USN First Marine Brigade Fleet Marine Force Pacific recently presented a paper before the Hawaii Territorial Dental Society

Captain **Marion E Roudebush** MC USN who has served as head of the neuropsychiatric service U S Naval Hospital Oakland Cali

f rnia ince 1956 h s be n re gned as chief of the neurop ychi t ervice U S N l Ho p tal Y k k J p n C pt n **Rob rt S Snyd r Jr** DC USN s the n w d nt l insp ct r gen ral f th Bu e u of Med ci e d Surge y His x cuti e as stant Lieut na t C mmand r **Rob t E R ck r** MSC USN M jor **Fr deric von Lehr** MSC USA r ce tly as m d th dut of chi f of tl e ducat on a d train ne bran h t Lette m n Army Hosp t l S n Fra sco H uc ceeded C ptain **Steph n J Ch ndl** MSC USA who tir d 31 J ly C pt n **M k L Park** DC USN h relieved C pt **R bert D Wyck ff** DC USN as head of th st dard nd tr nin ctio Dental Div si n Bur au f Medi i a d Su gery Capt n Wyck ff h be ass gn d a comma d offic r U S Naval Dent l Cli ic Yoko uk Jap n

C lonel **Fr ces I Loy** USAF (NC) ch f f th Ai Force Nurs C rp d s r bes th p par t for spac age urs i g in N t Stop— O t r Sp ce i th July *Am ica Joum l f N si g* m rki g th C rp 10th nn ver ry L eut n nt Col el **Elmer R Pede** VC USA h b en app nt d p t v t ri t an at Fo t Le v nwo th K n epl ng Col nel **Pl lip R Carter** VC USA who h s ret d Pri r t h s a s enm t at Fo t L v nworth Colon l Pede was v t ri n t F rt Bel i Virg ni Colonel **Lawr G Al x nd r Jr** MC USA in p t r g n l f Brook A my M d l C nt r nc 1958 et r d 30 Ju fte mo th 29 years of t ve r ce Captain **Philip J M Namar** MC USN h f f surgery at the U S Nav l Hospit l Phil delph recently sumed hi n w d ti a ex cut ve off cer of the U S Na l H p t l O kl nd Califo ni C l n l **Nels n S Irey** MC USA ch ef f th pathology rvice t L tterman Army H sp tal nce 1956 w promot d to h s pre nt rank n Ju e

C lonel **Willi m M Ream** DC USA i th new mmand ng off ce of the Cent al Dental Lab at y Bro ke Army M di l C nter F t Sam H ust n T xas Formerly c mm nd r of th S th U S Army *Central Dent l Labor t ry Al meda California he suc eeded Col el* **M ice W shbu n** DC USA wh has been igned to duty in Eu op Thr e Army Nurse C pt in **M s r at Iri arry S t go** F tz m ns Army H p tal De ver Colo ad d F rst Li ut ts **Erla J Fre dhoff** and **Shirl E Owens** It l nd Army Hosp t l Fo t K ox Ke tucky nd W lli m Be umont Army H pit l El P s T s esp cti ely are ec nt g aduat s of th fi st cla i b si op rat n o m t hni t Ma t n Army H pital Fort B ing G org C pt in **Georg C Rad r** DC USN a si ta t head of the pl ng nd lysis branch D ntal D vi on Bureau of M di ine and Surgery h b f med a a onsult t to the pecific t n c mm tt e t th de t l m te ls g oup f the I ter ation l A oc tion fo D tal R a h

Id t c l B l t l O l Carci ma cas port by C pt in **Th d A L s y** DC USN h ef f th d t l s v c U S N v l

Hospital San Diego appeared in the July issue of *Oral Surgery Oral Medicine and Oral Pathology* Captain **Sidney L Arje** MC, USN has reported for duty as head of the planning and special projects section Bureau of Medicine and Surgery from the U S Naval Hospital Camp Pendleton California Lieutenant Colonel **Agnes P Snyder** AMSC USA chief of the physical therapy branch Army Medical Service School Brooke Army Medical Center was principal speaker at a meeting of the Coastal Bend District Texas Chapter of the American Physical Therapy Association on 15 July

Captain **Hilton E Rose** MC USN commanding officer of the Naval Hospital at Quantico Virginia since June 1956 recently reported for duty as inspector general of medical department activities Bureau of Medicine and Surgery Lieutenant **Robert J Hanavan** MSC USN aide and executive assistant to the deputy surgeon general of the Navy since 1955 has succeeded Commander **Herman B Tidwell** MSC USN who retired 1 July as administrative officer at the National Naval Medical Center Bethesda Major **Joy B Crain** NC USA educational coordinator at Letterman Army Hospital who retired from active duty 30 June after more than 16 years of active duty plans to return to do volunteer social work

Colonel **William L Keller** USA (Ret) 85 distinguished surgeon and lifetime consultant to Walter Reed Army Hospital died July 10 Assigned to the hospital in 1919 his 16 year tour of duty in Washington was marked by several new and outstanding surgical procedures In 1935 when he retired after a 35 year military career Congress passed special legislation making him a lifetime consultant with full pay and allowances The Decoration for Exceptional Civilian Service the Army s highest civilian award was presented in July to Dr **Van M Sim** chief of the Chemical Warfare Laboratories clinical research division Edgewood Maryland for volunteer work in testing new chemical agents A 1944 graduate of the University of St Louis School of Medicine Dr Sim served in the Navy Medical Corps during World War II and the Korean conflict Lieutenant Colonel **James B Hartgering** MC USA was recently awarded the Walter Reed Certificate of Achievement in recognition of his work as deputy chief and later chief of the division of nuclear medicine and biochemistry for the past five years He is now chief of the biological and medical science branch Office of Research and Development Army Medical Service Research and Development Command

Colonel **James T McGibony** MC USA is the new chief of medical plans and operations in the office of the Army surgeon general succeeding Colonel **Angel A Cardona** MC USA now surgeon of the Military District of Washington Lieutenant Colonel **Gordon F Fisher** USAF (MC) has been assigned as chief of the preventive medicine division office of the Air Force surgeon general replacing Colonel **George K Fair** USAF (MC) now medical member of the physic evalu ation board at Andrews Air Force Base Washington D C

A Message From the A M A

Among the major subjects which brought important policy actions by the House of Delegates at the 108th Annual Meeting of the American Medical Association in Atlantic City last June were the report of the American Medical Association Commission on Medical Care Plans relations between medicine and osteopathy the report of the Committee on Preparation for General Practice and the issue of compulsory social security coverage for self employed physicians

The House received the report of findings conclusions and recommendations of the Commission on Medical Care Plans as information only and then acted upon the recommendations item by item Strongly endorsed was the recommendation that

> That such medical care benefits as results of collective bargaining should be sought in such choice from among medical plans for the population of such areas

The following statement of policy on freedom of choice of physicians was adopted

> The American Medical Association believes that freedom of choice of physician is the right of every individual and one which should be free to exercise as he chooses Each individual should be accorded the privilege to select and change his physician at will or to select his preferred system of medical care and the American Medical Association vigorously supports the right of the individual to choose between these alternatives

In considering a special report of the Judicial Council on the subject of osteopathy the House adopted the following policy statement regarding interprofessional relations

> (A) All voluntary professional associations between doctors of medicine and those who practice some system of healing not based on scientific principles are unethical

> (B) Endorsement of medical practice acts requiring all who practice as physicians graduating after the required examinations take the same examinations graduating from schools approved by the same agency should be encouraged by all the constituent associations

> (C) That it shall not be considered unethical for the Principles of Medical Ethics for doctors of medicine to teach students of osteopathic colleges which is in the process of being converted to approved medical schools under the supervision of the A M A Council on Medical Education and Hospitals

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From the Council on Medical Education and Hospitals of the American Medical Association The work of the Department of Hospitals —Editor

(D) A liaison committee be appointed by the Board of Trustees of the American Medical Association to meet with representatives of the American Osteopathic Association if mutually agreeable to consider problems of common concern including inter-professional relationships on a national level

The House approved and commended the final report of the Committee on Preparation for General Practice, which proposes a new 2 year internship program for medical school graduates planning to become family physicians The Committee included representatives from the A M A Council on Medical Education and Hospitals, the American Academy of General Practice and the Association of American Medical Colleges The suggested program would include a basic minimum of 18 months' hospital training in the diagnostic, therapeutic, psychiatric, preventive and rehabilitative aspects of medicine and pediatrics in a very broad sense, including care of the newborn A physician then could elect to spend the remaining 6 months for additional training in other segments of the program However, participants who plan to practice obstetrics would be expected to spend at least 4 months of the elective period in obstetrical training

With respect to the subject of compulsory social security coverage for self employed physicians, the House adopted a resolution reaffirming its opposition to the compulsory inclusion of physicians The House recognized the apparent growing demand by physicians for economic security" and requested the Board of Trustees to investigate the possibilities of developing group insurance and retirement plans which could be made available to Association members

Of particular interest to physicians in the military service is the reaffirmation by the House of Delegates of its position recommending the establishment of general or flag officer rank for the Director of the Armed Forces Institute of Pathology during his tenure of office The House also expressed its appreciation for the outstanding disaster medicine program presented by the United States Army Medical Service on 6 June 1959 at the seventh National Medical Civil Defense Conference which is sponsored annually by the A M A Council on National Defense

Among a wide variety of other actions the House of Delegates decided that every government program which has implications of or might lead to socialized medicine should be scrutinized with great care before the profession enters into any such program determined that the Association forcefully bring to the attention of its legislative representatives the importance of differentiation of funds for services of physicians and dentists from funds for drugs nursing care, hospitalization and other ancillary services and that the Association work to incorporate this policy of differentiation of funds in any legislation which does not specify the amount or portion of funds for physician and dentist services and request state and local societies to

adhere to this principle and implement it at all levels agreed to expend every effort to revise the wording of legislative acts to the effect of providing for payment or reimbursement of medical expenses rather than providing medical services as some statutes are worded in that the government does not in fact provide medical service and to request state and local societies to adhere to this principle and implement it at all levels recommended that state medical societies where advisable initiate legislative efforts to eliminate cancer quackery approved the inclusion of *Today s Health* and any one of the specialty journals chosen as benefits to dues paying members who will continue to receive *The Journal of the American Medical Association* and the *AMA News* as a benefit of membership urged all physicians to participate more fully in community activities and socioeconomic matters in their own communities but agreed that no change should be made at this time in Article II of the Constitution which states the Association s objectives reaffirmed its position of opposition to payment of residents in training for medical services approved in principle the aims and objectives of the President s Council on Youth Fitness and Citizens Advisory Committee on the Fitness of American Youth requested the Board of Trustees to study the problems and possibilities of establishing an A M A sponsored medical scholarship and/or loan program received a progress report indicating phenomenal progress in the field of health insurance coverage for the aged since the Minneapolis meeting last December reaffirmed its full support of the Educational Council for Foreign Medical Graduates expressed heartfelt thanks to the Committee on Amphetamines and Athletics which has completed its assignment endorsed the traffic safety postage stamp proposal as a means for stimulating in American motorists an awareness of the necessity for safe driving and urged every A M A member to give a substantial gift to the medical schools through the American Medical Education Foundation

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USA OFFICER PLANS ROK MEDICAL PROGRAMS

Thr key med c l p ogr ms wh ch w e dev lop d by Colonel Sant n J Lerro MC USA h ve been ad pted by th Republic of K r a Army M dical Serv ce Colon l L rro wa enior med c l dvisor to th Republic of Ko ea Army fr m 23 January 1958 to 30 May 1959 Th pr gr m c cerned r the tubercul c ntrol p gram the inter nd es dent deferment pl n and the b l ngual san tary gu d Col nel L ro r ce tly r eived the Commend tion Ribbon w th M tal Pendant f r h accompl hment H b c me ch ef of p of ss onal servic fo th new A y h p t l t Ok n wa the fi t of thi m nth

Book Reviews

ATOMIC MEDICINE edited by *Charles F Behrens* M D F A C R 3d edition 705 pages illustrated The Williams & Wilkins Co Baltimore Md 1959 Price $15

Six years have elapsed since the last edition of this review of a multiphasic and rapidly expanding field was published The new edition accordingly is justified and extensive care and reworking have gone into its preparation The list of contributors includes many distinguished members of and consultants to the national military establishment and generally the quality of their writing is very nearly comparable to the excellence of their technical knowledge The work embodies unfortunately a somewhat cumbersome system of numerical paragraphing The 24 chapters can be broken down into several broad subdivisions nuclear physics including radiobiology and instrumentation bomb effects both immediate and fallout radiation protection and clinical and research applications of radioisotopes The illustrations and diagrams are excellent This book should prove of especial interest to the health physicist and bomb project medical officer

—*WALTER G GUNN Capt MC USA*

DISEASES OF THE COLON AND ANORECTUM Volumes I and II edited by *Robert Turell* M D 1 238 pages illustrated W B Saunders Co Philadelphia Pa 1959 Price $35 for set of two volumes

These two volumes written by 82 collaborators under the editing supervision of Robert Turell M D who also contributed several chapters is encyclopedic in content The text covers all aspects of medical and surgical lesions of every type from the cecum to the pilonidal area The authors include many who are internationally known and all are well qualified One particularly interesting chapter is contributed by Edith Lenneberg the editor of the *Ileostomy Quarterly* on the ileostomy patient s point of view Pre and post operative care complications of surgery physiology of the colon and fluid balance problems are considered separately

The content is logically arranged in parts sections and chapters with diseases in one category such as functional disturbances being considered in one section of three chapters devoted to different aspects of the problem The volumes are well edited authoritatively written and the references and suggested collateral reading at the end of each chapter are current In the chapter on parasitic and protozoan infections however pictorial representations of the organisms are not included The volumes contain 634 figures

I have never seen a better presentation of the subject than is in these two volumes They are recommended to any physician who treats diseases of the colon anus or pilonidal area both for reference and for study The work is a must for medical libraries

—*DAVID E THOMAS Lt Col MC USA*

PERSONALITY CHANGE AND DEVELOPMENT As M ur d by th P o- j ct T h q by M lly H rr w Ph D 383 p g ill t d G & St t I N w Y k N Y 1958 P $10

Th s b ok reports a 15 y ar tudy wh rein data on app ox mately four thousand pat nt w e cc mul ted nd r viewed The major co tr b ti of the volum i n t th quant ty of pat ent ex mined but rather the l g tudi al pe ts of pe sonality e aluat on through the use of projective t hn c At le t fifty of the patie ts were re-examined on reque t f th or gin l refe rer and others were recalled for evaluat o The r p rt n thes fo med the cor of the study Good i form tion of l ngitud n l tudy type sparse in the area of pro-jective techn c us ge thu m king this volum ne of parti ular value Th book ncludes a good t t ment of need for follow p studies a w ll a for mor p ec e descripti ns of per n lity dynam cs Als there is an effi ient umma y of cur ent thi king on problems of re evaluation w th ed tor al comment n v rious find gs nd opin ons Altho gh Rorschach w s the p edom nant p ojecti e techn c employed others wer i clud d n v r ous ph ses of the study These included the Szond them t c appercept n t t draw a pers n sentence om pl ti n test nd ch ldr n s ppercept on t st O r all ev luations by various psychothe p ts re nclud d both for successfully d un ucces fully tre ted p t nts This is bo k which is recom ended for th efer nc sh lf f th clin al psychol gist and for the use f g duate stude t t the ntern l el f tr ning in th field of cl nical psychol gy.—*FREDERICK A. ZEHRER C I MSC USA*

LESIONS OF THE LOWER BOWEL by *R ym d J J km* M D M S P t l gy 347 p g ll d Ch l C Th m P bli h Sp gf ld Ill 1958 P $15 50

Th s volum is an e p ci lly val ble proct logic textbook b c u t is conc rn d lmo t e tir ly w th di gnos f ano ect l nd s mo d diseases It th refo e complement other similar t xts which e d voted to ther peut s Log cally Dr Jackm n beg ns witl v ry worthwhil though br f ch pter on an tomy and phys ol gy co ering ntr mur l i t n l nd xt n l structur s of th lower colonic are H th n turns to th details of d gnost c technics spec ally procto-scopy and t an r ct l b psy In ucc ed g ch pters he discusse the diff rent al d agno s of ulcer ti f the mucosa ntr mural tumors xt i ic lesi n wh ch nv de the col n extr r ctal mass s retro ectal tum r tr ns n l bleed ng anorectal pain and nal and p i al ki le i n O of th outstandi g d agnostic aspects f th s lum i th l ge number of exc pt o al c lor photo-g ph m tly t k n thro gh th pr ct scop or sigmoid cope The e b t e w y of gett ng a d gnost c point acros th n by the use f l ph t g phy E e y cli an w ll f nd Dr Jackman s book f lu b h g n l p ct ti n u g n inter ist proctolog t g t t l g t h t kn wl dge nd xp r ce are nicely e d d f the b n f t of th —*LESTER J POPE C pt MC USN*

CURRENT THERAPY—1959 Latest Approved Methods of Treatment For the Practicing Physician edited by *Howard F Conn* M D with 12 consulting editors 781 pages W B Saunders Co Philadelphia Pa 1959 Price $12

This eleventh annual edition of *Current Therapy* meet the high standards set by the editor of the previous volumes The number of contributors has been increased to 305 and are of sufficient stature to speak with authority The 12 consulting editor are the same as of the previous edition

The book is divided into 16 sections and compo ed of 781 pages including infectious diseases the variou body y tem , allergy, and physical and chemical injuries It pre ente the method of therapy of an individual authority for each included morbid condition For the mo t part each condition is pre ented in a clear and concise fashion, and includes both principles and detail of methods The format and indexing are of such a nature a to make all of it contained information of finger tip availability Covering as it does practically all phases of therapeusis in the entire spectrum of medical sciences a single volume can only present one method for each entity It i inherent in such a concept that some pre entations will be didactic Some statements are made to which rea onable exception might be taken by the reader For example emetine is offered as the fir t drug of choice for the routine treatment of extraintestinal amebiasi and for bites of poisonous snake (American pit vipers) incision and strong suction are unequivocally recommended The preface state th it the topics have been rotated among contributors at the reque t of readers who wished to have acce to other treatment methods There is till only one method in this volume however For other methods previou editions must be con ulted In fairness these critici ms are rather minor and detract little from the real v lue of the book Of special use are tables of poisonou substances in common hou ehold item , and of active ingredient in variou commercial product New in this edition are tables of normal laboratory value of clinical importance in the inside of the front and back covers

—*JAMES L. SPENCER Capt MC USN*

THE ANATOMY OF THE NERVOUS SYSTEM It Development and Fu ction by *St phen Walte Ra so* M D Ph D revised by *Sam L Ha d Clark* M D Ph D 10th dition 622 p g s llu trated W B Sau ders Co Phil delphi Pa 1959 Pric $) 50

The tenth edition of this text of neuroanatomy has additional pages and fewer illustrations but still retains its portability in terms of weight and its readability in terms of length Despite its newness the work retains most of its original illustrations and format The most notable change is that which occurs in an expansion of the table of contents so that the subject is much more easily discovered This change in the table of contents is not comparably reflected in the book itself Most of the subject material has been in previous volumes but not so extensively itemized Over the years another change is that the

we illu tr t ons have tend d t be in the form of di grams with less of an attempt to appr x mat actu l pec m n Alth ugh this dds cla ity th k d of el b r t on can be fford d nly because th origi al illustrations were uch cl s eplicas of actual sp c mens The v scular sy tem emains in th first few chapter presumably in k eping w th cur ent pr bl ms of cerebr va ular d se (thi change ccur ed actually in the e ghth dition) Th b ging up t d t of the bo k s eally n the fo m f m r dd tions her and there For xample th r are few mor wo ds on th r t cular format on in two epar t chapte s An th r illustration m ght be th t although th parts the hyp th l mus h ve b n g adu lly exp nded ov r th years th e is littl ch g from r ent editio It would mply t this r v ewer th t the la k of ne d fo gre t ch nges me n th t most of the mate i l h be n pretty fundamental Thi b k on of the very b st of t clas A tend ncy for r l t ve de rth of lin cal correlation to b comm nded The e is st ll r om f the tudy of neur natomy a subject the eby n indisp nsable f und tion f r n urology laid —*WARREN E PORTER, M ; MC USA*

SURGERY OF THE SYMPATHETIC NERVOUS SYSTEM by P f S *J m P t R* K C V O LL D M S F R C S F R A C S F A C S 3d d t 170 p g ll d Th W lliam & W lk C mp y B l m Md 1959 P $8

Th the third d t on of well tablished book on th urgery of the ympathetic nerv u ystem It w tten in a cl r style which s e y to read and compr h nd and w ll p ove espec ally v luabl s a gu d to the indicat n fo surgery of the symp th t c nervous sys tem Speci l enjoyment is pr v d d by anecdote f medi al h tory throughout the var ou hapters The views on c usalgia from tho of Percivall Pott to Weir M tch ll re nl ght ning Wh re s the pre- vious ed t on mention d ympathe tomy a succ s ful t atm nt of shorten g of the par lyz d limbs s c ndary to ante poliomy l t this v lume sheds doubt that the le gth of the affe t d limb has be imp oved ppr ciably by op r t on A s m lar about f ce h s b n m de in th treatment of chronic arthr t s The ond ed t n state that symp thect my is est bl h d as a tr tment f chron c arthritis The p esent book express the beli f that th re ults f oper t h v been d appointing Th are but two examples g v n to poi t out the chang ng oncept r ached n wide surgic l xper enc nd l ng clini l f llow up of p t nts Th three ed t ons f this book fo m n volutionary h to y of th urgery f the sympathet c nerv us system d the pre nt editi n a culm nati n f a va t am unt of xper c n this f ld The bo k co t n six chapter One dealing w th the tre tm t of a t r l hypert n ion and noth r w th hype hydro i are t p n t incl ded in pr vi u editi n The f m t nd illustr t ns of this b k h ve b n mp oved The bibl ogr ph e t th conclu n of e ch ch pt h v n t b en b ught up to d te w th th pr s nt ed tion Thi book is r omm nded t ll thos t r t d th urgery f th ymp thet c n rvous ystem

—JOHN B. MOYAR Maj MC USA

and electroenceph logr phy often may demon trate b ain damag The last part of the sympos m was de ot d to d cu s ns on the ra ing c re and beh or of monk y —appare tly considered most ppropri t f r future an mal research in the are co er d by th s symp sium The publ shed ymposium has an excellent bibl graphy and s well in dexed Fo those wh w sh to keep abr ast of research progress in cerebral pal y and cl ly related f lds th s book may be mo t h lpf l —*ARTHUR J LEVENS Li C I MC USA*

OUTLINE OF FRACTURES l d g J t I jur by *J b C awf d Ad m* M D F R C S 2d d t 268 p g ll t d Th W ll am & W lk C B l m Md 1958 P $6 50

Th au hor pre nts a onservati e approach based on s u d p nci ples b t does not he tate to ad ocat urg y when it off rs d st nct dv t ges The m ter al s pr sent d in a comm n s n e manner w thout bl d adh nce to rigid precepts Exc llent summar s of t eatm nt ar includ d t the e d of m j r se t ons f r te dy refere ce The d grams are i struct v d th x ray p oducti ns well cho en A f w points re ope to qu st on In children s fr ctures overgr wth f a bone f m t mul t on may be as sig ific t cl cally r sidual h rt ning and le gth d cr p n y may be more th n l ght Com parison x rays in childre s fr ct re spec l lly the elb w sh uld b mphasized The u of oblique transfix tion sctew f r spir l r obl que f ctures of the tibi is deb tabl The crew m ght better be placed at right angl s t the bon shaft to avoid shearing str sses The u e f lotted plat n cert in types of fractures hould be men t on d The autho ad oc tes e rly mob l zation after j nt i jur es Thus sho ld be d e w th gr at disc etio d pend ng up n the ex tent of th njury and the j int invol d In the t e tm t of sp e c mpr n fractu es I disag ee w th thre m nth period f m mob l z t on in *f ll* ext n On m ght q ibble o e f ation of ac omi cl v cul r d loc tions with a pin or w r placed ac o s the j nt eduction of sh ulder d loc t ons with th dang rous Kocher m ne v r nst tution of cti e m v m nts a few days after cute hould dislocation e c ion of a dist l ulnar f apment wh n the fr ctur is 3 inches prox m l t the w st j int a below elbo plas ter w th the wrist n neutral posit on f r immobiliz tion of a Colles f actur and the qu st o ble me it of s mpl excisi n of the av scula f agment in c rp l scapho d fr cture M ntion might have been made f the be gn pro edure f radial tyloidect my n n union of the arpal scapho d and the hang ng cast method of tre tment for hum ral f a tu Th v wer heart ly ndorse the use of open a d lo ed f tur termi ology the term posttraum t c ossif cati n nste d of h m m my t o s f ns and the thought th t physical h py sh uld supplement n t s ppl t th p tient s ndependent ff nd the p opo d tot l xc on of the c rril ge n kn men u njur Th t t h ghly ecomme d d f r the purp n d d —*EARL W BRANNON C I USAF (MC)*

RECENT STUDIES IN EPIDEMIOLOGY edited by *J Pembe ton* M D M R C P D P H and *H Willard* M D 203 pages Charles C Thomas Publi her Springfield Ill 1959 Price $5 75

This small volume reports 18 epidemiolo,ic studies presented to the Study Group on Current Fpidemiological Research meeting in Hol land in September 1957 Althou,h reports were primarily presented as a vehicle for discussion of the epidemiologic approach and method each of them is a most interesting dissertation on one or more facets of epidemiology

Doll s report on cancer in nickel workers is classical in procedure and form and well illustrates the use of existing records in epidemiologic studies The other four reports in this section on utilizing exist ing records nicely display variations of the classical technic The chapter on Ad Hoc Field Su,gery—Getting Your Own Data has five thou,ht provoking studies Studying disease in families Robert Cruickshank presents some interesting data on the introduction and spread of respiratory disease Raska using similar technics makes several original observations on infectious hepatitis as a communi cable di,ease of families E K Cruickshank presents far too brief accounts of three unusual non infectious diseases seen in Jamaica His explanation of vomiting sickness "veno-occlusive disease of the liver and his introduction to the epidemiology of an unsol ved neu,ologic problem are fascinatin~ The other chapters deal with the application of the epidemiologic method to the evaluation of health needs and services and to general practice Scattered in the previously indicated chapters are investigations of both communicable and non communicable diseases

This is not a book to be read rapidly but one to be perused at leisure Each report should be thoroughly di,ested savoring the nuances of the author s method and following with him his analyses and conclusions It is an essential volume for preventive medicine personnel and is recommended reading for all personnel All of the reports con tain interesting and though provoking observa ions and many of them will stimulate constructive thinking on several military medical problems —*LOUIS C FOSSLTH Col USAF (MC)*

DIFFUSE LESIONS OF THE STOMACH An Account with Special R ference to the V lu of Ga tr c Biop y by *Ia J Wood*, M D F R C P F R A C P and *Leor l Taft* M B B Sc 86 page Il strated The Wlli ms & Wilkin Co Baltimore Md 1959 P ice $6

In 1949 Wood develoned and described a flexible gastric biopsy tube which permits blind painless rapid and safe removal of small frag ments of mucosa from the stomach The principle of sucking a knuckl of mucosa in o a chamber then amputating it by pulling a knife blad past the hole has been employed by almost all subsequen anoaans for blind biopsy of intestinal mucosa including the Shiner tube f duodenal and jejunal biopsy and the Crosby capsule for small bow l

bi p y Th auth nd th ir as t t the R y l Melbourne H p t l h v performed 1 736 successful bi p i on 1 046 p t nts The only c mplic t f the procedure has been hem rrh ge n 10 p tient w th only two requirin t n fu Th w fatal t s Th s exper enc with g t m cosal biopsy is describ d nd in livídu l ch pt r are devoted to cute g t t h c g t t J ffu giant hyp rt ph c g t t s and g tric tr phy Other t chnic fo ex mi t n f th tom ch were empl y d but ga t py f l d t l abnorm litie i m ny 50 per cent of p tients w th b p y e idence f g t t Th authors believe g st ic m o l b p y t be of v lue d term g th c use of chr nic dy peps wh n neither th x ay o gastrosc py v al n l a c a d recommend t u chronic iron defic ency an mi ub cute combi d d g ation of the c rd d chlo hyd a The uthors conclusions are umma z d on p ge 52 It is our op i that the accept nce by phy c ans and surgeons f chr gast it a a real disease ent ty w th sp cific sympt m nd g i e ent al to th *efficient pr ctice f m d cin Few people h ve h d u h tensive* p rience with bi p y m teri l s Dr Wo d but even the few do not enti ly agre with this st tement Among th t of us there i l a trong skeptici m concer ing th cl n cal import nce of chr n ga trit s The book is w ll d and this work must be consider d by all who i v t gat t at pat nts w th stom ch dise se

—BENJAMIN H SULLIVAN J C l MC USA

EMERGENCY SURGERY by *H m lt B l y* F R C S (E g) F A. C S F R S E 7 h d 1 197 p g ll t d Th W ll m & W lkin C mp y B l m Md 1958 P $32 50

The new ed t on of th s w ll known wo k ha be r v d d b ght up to d te The book is divided into sections the largest f which d al w th th bdom Th r al o di u s of ge l me sures eye e r no e and th oat th ax h ad and n ck extre m tie nd tropical emergencies Th ect on on th gen tourinary t ct p c lly tho ugh B u there m ny e cellent b ks devoted to fractures simple clo ed f a tur a not d scus ed A ppendix incl des dditional dat on some finer points as w ll a add t onal cerpt fr m the nt l t tur

The tyl i ve y re d ble and the auth r s ye rs of surg cal expe enc re fl cted in th w alth of i f m t n the b ok co tai Bec use it s wr tten for th jun r surgeon each subj t i c er d n g t d t tl d even the more expe ien ed s g w ll f nd much f ter t nd f val Th t on th subsp i lt es may be t larly welcome to tho who h ve n t h d e per nc in these f ld Much of th urg l q pm t nd upplie de crib d are man f tu d n F gl d It w a l ttl d conce ti g howev r t f d th s f m g n d t d by omp on rather th by m m ur m nt *—PHILIP D CRONEMILLER Capt MC USN*

THERAPEUTIC RADIOLOGY Pa.ionale Techniqu Pesults by *William C Moss* M D 403 pages ill s.ated C V Mosl / Company St I ouis Mo 1959 Price $12 50

Unlike many texts of radiotherapy thi new book does not present a standard therapeutic technic fo each dis.ase process but rather discusses the philosophy of radiation therap/ as it applies to these problems Its intent is achieved in that it gives the reader a broa l foundation from which a sound and lo,ical approach to the treatment of the individual patient may be develope l The recent literature as well as the author s extens.ve experience are coordinated to produce an easily read highly informative volume Comparisons are carefully made with the results of competing an l combin d forms of therapy when the available series of ca e are of similar composition The book contains 20 chapters each of which is devoted to a single anatomic system The respon e of the normal tissues of e ch system is discussed at the beginning of the chapters The a lvantages of supervoltage therapy are discu e l where applic ble No attempt has been made to cover the field of ra lioisotope th rap/ inasmuch as so many excellent textbooks on the subject are now available This book will be used by all radiologi s but it will be of special value to the young radiotherapist in his formative years

—MA I HIW I YIHHY II MC II H

GEOGRAPHIC OPHTH AL IOLOG / e.ite l by *William Jo n H I es* M D 2?3 pages illustrated Charles C Th mas Pu lish r Springfi ld, Ill, 1959 Price $8 50

The title of this book is apt/ utilize l to bring tog ether articles about both eye diseases w hich are ch aracteristicall/ prevalent in remote areas and technics used in oth r countries which are not generally used here In our present contracting world areas that were once considered to be remote are but a fe w hours a wa/ from us b/ jet plane This fact coupled by an increased trav el both by our own citizens an l citizens of other areas of the earth an l by our far flung military in stallations warns us to be on the lookout for ocular diseases of which we might otherwise not be cognizant The initial ch pter constitutes a challenge to the leaders in ophthalmology to exp an l the fiel l of prac tice to remote areas and to tie the practice of tea hing an l research closer to a world wide common pool of knowle lge With the exc ption of a very few rare and definitely localize l di eases like onchocercia sis a microfilarial disease the great ocular plagues such as leprosy, trachoma and malaria are endemic all over the world an l are only subjugated in civilized regions by constant vigilance This book is well worth reading and adding to the ophthalmologist s library, even if only to remind him of the continued presence among our patients of eye diseases that we have reduced to a minimum l ut have not totall/ eradicated and which may appear in our offices and clinics unexpectantly —KARL D Ma MILLA I Col MC USA

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THAT THE PATIENT MAY KNOW An Atlas f r Use by the Physician in Explaining to the Patient by *Harry F Dowling* M D Sc D and *Tom Jones* B F A assi t d by *Virginia Samte* 139 pages illus trated W B Saunders Comp ny Philadelphia Pa 1959 Price $7 50

THE ART SCIENCE AND SPIRIT OF NURSING by *Alice L. Price* R N M A 2d edition 864 page illu trated W B S under Company Philadelphia Pa 1959 Price $5 50

HYPERTENSION The Fir t Hahnemann Sympo ium on Hypert nsive Disease edited by *John H Moy r* M D with 6 contributors 790 pages illustrated W B Saunders Company Philadelphia Pa 1959 Price $14

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Monthly Message

This is the occasion for congratulations First the *Armed Forces Medical Journal* makes its appearance in new format I am sure that this is a great improvement over the past We hope also that the quality of the articles which have appeared in it will not only continue at a high and informative level but may even improve as well as should always be the case Over the past two years the editor Captain Bennett F Avery MC USN and now Colonel Robert J Benford USAF MC have devoted much time and energy to the *Journal* Captain Avery is now the Director of the MFND Program and Colonel Benford has returned to his former position as editor in chief of the *Journal* He now has a full time civilian *Associate Editor* May *Sherman* M D *formerly with the National* Institutes of Health We wish the *Journal* the greatest success and continued growth

We have failed to note before but this year marks the tenth anniversary of the United State Air Force Medical Service If one considers the changes or perhaps one should say the last extension out into space and the problems that confront the Air Force compared with those in 1949 they are almost breathtaking One cannot but be amazed at the way the Medical Service has kept abreast of these problems and is constantly seeking answer for new questions as they arise The medical research facility at Randolph Air Force Base has been transferred recently to its new quarters at Brooks Air Force Base near Lackland Air Force Hospital and here in conjunction with the work of the Aerospace Medical Laboratory at Wright Patterson Air Force Base and the Air University at Maxwell we may expect even better accomplishments

Frank B Berry

FRANK B BERRY M D
Assistant Secretary of Defense
(Health and Medical)

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Foreword

The *United States Armed Forces Medical Journal* is the medium for disseminating information of administrative and professional interest to all medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the several services invite all medical officers, dental officers, Medical Service Corps officers, Nurse Corps officers, and officers of the Veterinary Corps of the Armed Forces, and the medical consultants of the Army, Navy, and Air Force to submit manuscripts for publication in this *Journal*.

FRANK B. BERRY, M.D.
Assistant Secretary of Defense
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Energy Requirements of Military Personnel During Basic Training

C FRANK CONSOLAZIO
JEAN M HAWKINS B S
OGDEN C JOHNSON PH D
THEODORE E FRIEDMANN, PH D

DURING the past 4 years nutritional surveys have been in progress to collect data on the nutrient composition of the ration as consumed in the Army mess by the soldier undergoing basic training and on that portion of his diet which is obtained from the post exchange and other outside sources. Observations also were made on the various food losses and wastes. The overall purpose was to determine the nutritional adequacy of the ration (as formulated in the U S Army master menu) and its ability to supply the physiologic energy and nutrient needs of the soldier under temperate climatic conditions.

The studies were conducted on two basic training companies at Camp Pickett Va two basic training companies at Fort Riley Kans, three basic training units at Fort Ord Calif and two training cycles of airborne trainees at Fort Benning Ga.

The physical activities of the units studied fell roughly into two categories moderate to heavy activity as in the seven companies in basic training at Camp Pickett Fort Riley and Fort Ord and very heavy activity as exemplified by the intensive airborne training and physical conditioning in the two training cycles at Fort Benning.

The majority of the soldiers were draftees between the ages of 17 and 25 years most of these were under 20 years of age. Many of the soldiers were still growing and therefore possibly required a higher nutrient intake for growth purposes than fully mature soldiers.

These studies were made for several reasons. First, they help define a soldier's energy needs at a critical time in his career. Certainly his nutrient needs in basic training are high perhaps greater than at any other time in his Army life. Second with this knowledge

From the U S Army Medical Research and Nutrition Laboratory Fitzsimons Army Hospital Denver Colo

assumption that one gram of body weight change is equivalent to an intake of 6 18 calories plus 10 percent for specific dynamic action

The caloric intake adjusted for changes in body weight of 3 698 at Camp Pickett 3 952 at Fort Riley 4 179 at Ford Ord and 4 994 at Fort Benning (table) was still considerably higher than the 700 calories prescribed in AP 40- 64 for physically active men It must be considered that these troops who were within the teenage group were engaged in strenuous basic and airborne training and as a result required a large caloric consumption for growth purposes and also for the added energy expenditure The Food and Nutrition Board of the National Research Council recommends nutrient intakes of 750 and 4 000 calories per man per day for the upper levels of heavy activity for men aged 20 years and with weights of 65 kg and 70 kg respectively This is in line with the prescribed allowance of the British Medical Association which recommends a caloric intake of 500 calories for men performing heavy work and 4 950 calories for men performing very heavy work The Food and Agricultural Organization report on calorie requirements states that in a large population the number of persons engaged in work demanding 4 000 calorie is relatively small (only loggers and coal diggers)

The high caloric intakes in this study (3 700 to 4 960 calories) correspond to a high energy expenditure level of 4 0 to 5 0 calories per minute for at least 8 hours a day which results in a daily expenditure between 3 800 to 4 300 calories This probably represents the upper limit of daily energy expenditure that can be maintained regularly in heavy industry Lehmann and Muller state that 5 calories per minute level (8 hours per day=2 400 cal) is called the endurance limit and represents the approximate upper limit without increasing the lactic acid or body temperature that a man can normally maintain 6 day a week week after week and year after year

These corrected caloric requirements of troops in training are higher than the basic minimal requirements of 3 600 calories in AR 40-564 for physically active troops On the basis of the work of Lehmann Muller and Passmore and Durnin these trainees should be classified in the same group as mountain troops on maneuvers performing strenuous activities and as a result should require an increased caloric intake above 700

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SUMMARY

During the past 4 years, four nutrition surveys were performed in Army camps (1) on two basic training companies at Camp Pickett, Va. (2) on two basic training companies at Fort Riley, Kans., (3) on three basic training units at Fort Ord, Calif. and (4) on two training cycles of airborne trainees at Fort Benning, Ga. The total food consumption corrected for body weight changes from all sources averaged 3,698, 3,952, 4,179 and 4,227 calories at Camp Pickett, Fort Riley, Fort Ord and Fort Benning, respectively. This included 727 calories per man per day from sources outside the mess. The fat consumption of the 4 training companies averaged 42.4 percent of the total calories consumed.

ACKNOWLEDGMENT. The authors gratefully acknowledge the cooperation of their many colleagues especially Dr. E. M. Barrott, Lieutenant Colonel R. Ryer, III, Dr. Walter J. Kuhl, Jr., Dr. William R. Best, Captain Florence M. Berger, AMSC, Master Sergeant Thomas Hutton, Sergeant First Class Jane Farley and Sergeant Frederic Sauer, Dennis Donovan and Richard Murphy, without whose help and assistance these studies could never have been performed.

REFERENCES

1. Kuhl, W. J., Best, W. R., Berger, F. W., Consolazio, C. F. and Friedemann, T. E.: Nutrition Survey of Two Company Messes, Camp Pickett, Virginia, 8 September to 3 October 1952. U.S. Army Medical Nutrition Laboratory Report No. 104, Dec. 30, 1952.
2. Ryer, R., III, Consolazio, C. F. and Berger, F. W.: Nutrition Survey of Two Company Messes, 10th Infantry Division, Fort Riley, Kansas. U.S. Army Medical Nutrition Laboratory Report No. 118, Apr. 30, 1954.
3. Report of Nutrition Survey at Fort Ord, California. Staff of Nutrition Survey Division, U.S. Army Medical Nutrition Laboratory, Mar. 1954.
4. Consolazio, C. F., Hawkins, J. M., Berger, F. W., Jones, O. C., Matzen, R. B. and Skala, J. H.: Nutrition Survey of Two Consecutive Training Cycles of the Airborne Training Battalion, Company G, Fort Benning, Georgia, October–November 1953. U.S. Army Medical Nutrition Laboratory Report No. 166, May 23, 1955.

Nutrition. Army Regulation 40–64, 9 February 1956. Department of the Army, Washington, D.C.

Recommended Dietary Allowances. Revised 1958. Report of the Food and Nutrition Board, National Research Council, National Academy of Science, Publication 589, Washington, D.C.

Johnson, R. E., Kuehnert, R. M., Environment and food intake in man. *Science* 103, 838–839, Apr. 11, 1946.

8. Rodahl, K.: Nutritional requirements in cold climate. *J. Nutrition* 53, 483–488, Aug. 1954.
9. Murlin, J. R. and Hildebrandt, F. M.: Average food consumption in training camps of United States Army. *Am. J. Physiol.* 49, 531, Sept. 1919.
10. Hove, E. L. and Berryman, C. H.: Average food consumption in training camps of United States Army (1941–43). *Am. J. Physiol.* 144, 588–594, Sept. 1945.

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Liver Embolism to the Lung as a Complication of Trauma

MAJOR EDWARD H JOHNSTON, MC USA

PULMONARY EMBOLISM produced by fragments of liver tissue is a very unusual finding in autopsy material The presence of particles of intact hepatic tissue in pulmonary arteries has in every instance been a complication of trauma to the liver This finding should not be confused with that of liver cell emboli in pulmonary capillaries which may occur in liver damage unrelated to trauma

The first description of liver tissue embolism to the pulmonary arteries was made by Jurgens[1] in 1886 and independently by von Recklinghausen in the same year In each of these cases gross hepatic tissue was seen in the pulmonary artery and was a complication of severe liver trauma Two years later, Schmorl performed an autopsy on a man who had been crushed between the bumpers of a train He was impressed by the presence of gross liver tissue in the pulmonary artery He considered it such a rare finding that he reviewed the writings of Jurgens and von Recklinghausen and reported two similar cases of his own In the same year Zenker described the distribution of gross liver tissue in smaller pulmonary arteries in the case of a gunshot wound of the liver No further observations are recorded until 1930 when Willer evaluated all the previous medical literature and reported a case in which he found gross liver embolism in the pulmonary artery as a complication of severe liver trauma Straus[2] performed an interesting research study in 1942 on a large series of coroners cases He systematically reviewed all the lung tissue from 104 autopsies in which the liver was the site of mild to severe injury, and screened the material primarily for hepatic emboli From this group he elected 40 severely lacerated livers and prepared many lung sections for study This material resulted in finding one case with microscopic liver tissue in the pulmonary arteries

During World War II Lippincott and Bredt reported a very unusual case of a 27 year old white man who was accidentally crushed by a military truck The case revealed complete occlusion of the

From Armed Forces Institute of Pathology Washington DC

main pulmonary artery by a large fragment of macerated liver tissue in association with rupture of the liver and laceration of the inferior vena cava. In 1951 Ezell and Willard reported a case of a 17 year old girl who died hour after an automobile accident from multiple ruptures of the liver. Microscopic study of the lung revealed the plugging of a small pulmonary artery by a fragment of normal liver tissue. Studies made by Hickey and Stembridge on a series of 930 aircraft accidents added 2 more cases of microscopic liver tissue in the pulmonary artery. Both cases represented a most severe form of body injury.

The purpose of this article is to report on the frequency of liver tisssue emboli occurring in autopsy material routinely reviewed by the forensic pathology section of the Armed Forces Institute of Pathology (AFIP). A series of 1 10 autopsies restricted to traumatic death *from vehicle accidents fall from heights and crush* injuries was examined. Only routine lung sections were screened. From this group 287 cases were found to have mild to severe liver injury but only 6 of these (cases 1 through 6) had microscopic fragments of liver tissue in pulmonary arteries. Four others (cases 7 through 10) unrelated to this review but found in the files of the AFIP are included.

CASE REPORTS

CASE 1. A 24 year old (AFIP Acc No 0 384). A 4 year old white man was involved in an automobile collision. He died enroute to the hospital. At autopsy the liver was found to be the largest of the multiple fractured abdominal viscera. Microscopic examination revealed fragments of liver tissue in a small pulmonary artery.

CASE 2. A 21 year old (AFIP Acc No 3 460). A 21 year old white man was killed instantly when he was struck by a train. He was found lying between the tracks. The patient's right arm was amputated and the left fifth lower leg was fractured. Microscopic examination revealed fragments of liver tissue in the lung.

CASE 3. Blunt force abdominal trauma (AFIP Acc No 383). A 29 year old white man was struck by a truck. He was found lying in the street. The patient's liver was lacerated. Microscopic examination revealed fragments of liver tissue in the lung. (fig 1)

CASE 4 Auto accident (AFIP Acc No 819181) A 21 year old Negro man was in a head on collision between a car and a tractor trailer gasoline truck He survived 30 minutes after the accident Autopsy showed the liver and pleen to be ruptured The liver had severe maceration of both lobes Multiple fracture were present in the ribs and in the bones of the lower extremities Microscopic study of lung tissue showed fragments of liver tissue in several pulmonary arteries In one arteriole the liver fragment was very small (fig 2) In a larger vessel the particle was positioned as a saddle-type embolus (fig 3)

CASE Auto accident—pedestrian (AFIP Acc No 6 8678) A 5 year old white boy was struck by a civilian vehicle on a military base He survived 2

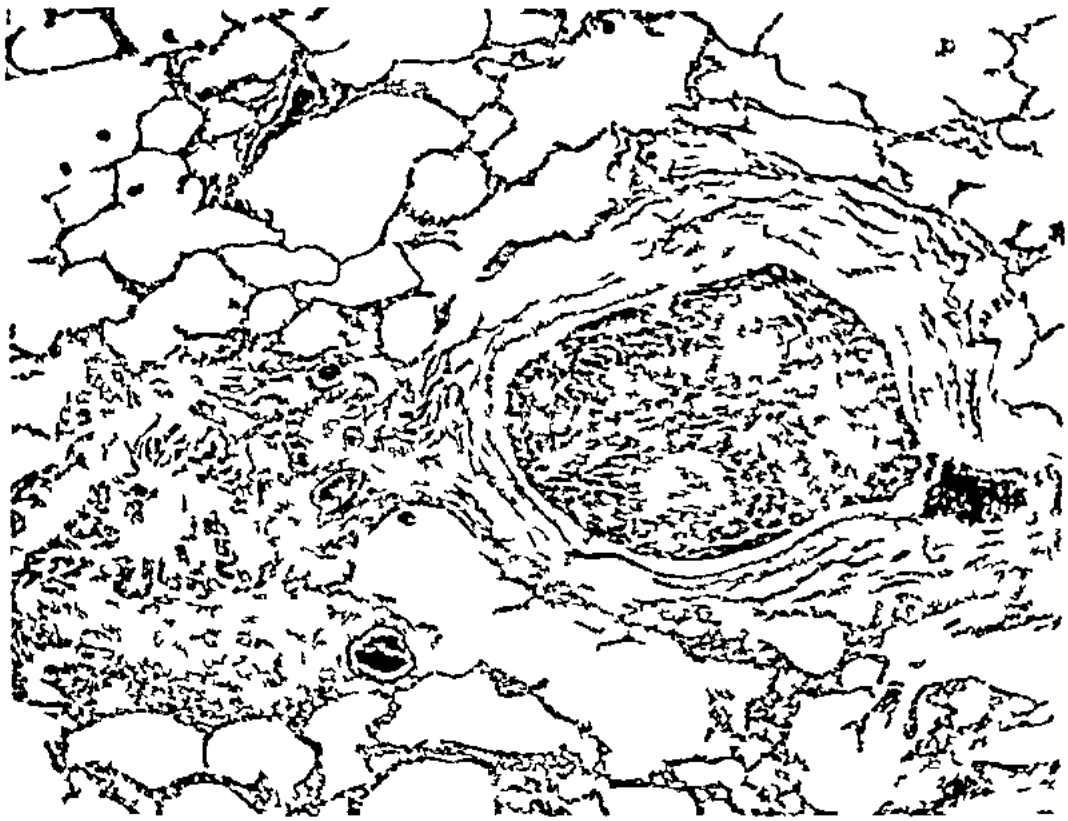


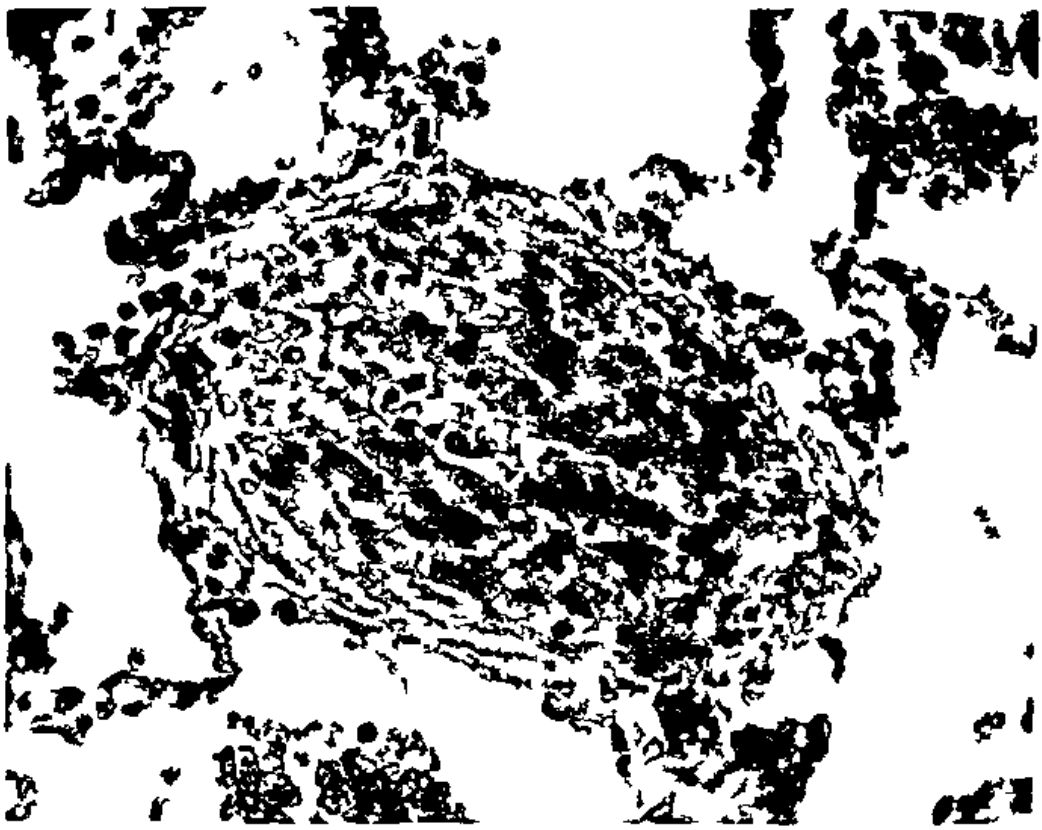
Figure 1 (case 3) Small part of wall of pierced lesion in pulmonary artery (Armed Forces Institute of Pathology negative 57–552 –1) (Hematoxylin and eosin stain x 50)

days after the accident At autopsy both the liver and pleen were found to be ruptured Microscopic examination of the lung revealed a large fragment of liver in a pulmonary artery The wall of the vessel was markedly distended and the liver cells were very much compressed and seemed contoured to the lumen of the vessel (fig 4)

CASE 6 Truck accident (AFIP Acc No 8 804) This 19 year-old white youth jumped from a moving military truck He was crushed beneath the vehicle Death occurred soon after the accident At autopsy the liver pleen and both adrenal glands were found to be ruptured No fractures were found Microscopic studies of lung tissue disclosed a large fragment of liver lodged in

n medi ed n t y I t t li e l bule a hitectu w s pres t and portal p w ly se r (fig 5) Both the till t r t live ti u a l th ml ll f g nt h wed l t f tty m t m ph l

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sc pic tudy of the lungs h wed a dumbbell haped fragment of intact normal appearing liver cell in a medium ized pulmonary artery

CASE 9 Gun hot w und of abdomen (AFIP Acc No 411413) A 21 year old white man accidentally hot himself in the lower abdomen with a 22 caliber long rifle pistol At laparotomy perforations of the intestine liver diaphragm and right lung were found Death occurred from a subacute peritonitis on the 49th day after the hooting Microscopic examination of the lung howed a fragment of necrotic liver tissue within a medium ized pulmonary artery



Figure 3 (Case 4) Large fragment at the bifurcation of a pulmonary artery containing a small embolus (Armed Forces Institute of Pathology negative 57-52-3) (Hematoxylin and eosin stain 60)

(fig) Numerous intact liver cells were detected in the enter of the vessel which was occupied by phagocytes containing brown pigment granules The periphery of the vessel contained intact liver cells One surface of the liver fragment was apparently attached to the endothelial surface of the artery

CASE 10 Automobile accident (AFIP Acc No 3446) A pregnant woman was involved in an automobile accident She was known but he was dead on arrival at the hospital Several hours after the accident Autopsy revealed several lacerations of the liver Microscopic examination of the lung showed an intravascular pulmonary artery In addition to the embolus there was a small amount of amniotic fluid



Fig 4 (Case 5) Large fragment of hepatic tissue in pulmonary vessel with adherent blood clot (Hematoxylin and eosin, 325)

COMMENT

The detection of liver cell emboli in smaller pulmonary arteries of the lung has a medicolegal application especially in cases where it cannot be determined whether the trauma was ante mortem or post mortem. In order for a fragment of hepatic tissue to be pumped into the pulmonary circulation life must be sustained at least momentarily. Of the 10 cases in this report 3 died almost immediately of trauma and the longest survival was 49 days.

The fate of the smaller pulmonary liver fragment embolism remains still unsolved. Usually the trauma itself is severe enough to cause death. Experimental work on animals using intravenous injections of fine particles of embryonic liver tissue was done by Lengemann. He used rabbits dogs and cats as his experimental animals. After the first day he found some active mitoses in the large masses of liver cells. Large areas of early degeneration. Ten days after injection only a faint outline of the cells were observed. From 1 day and beyond the animal showed evidence of organization and

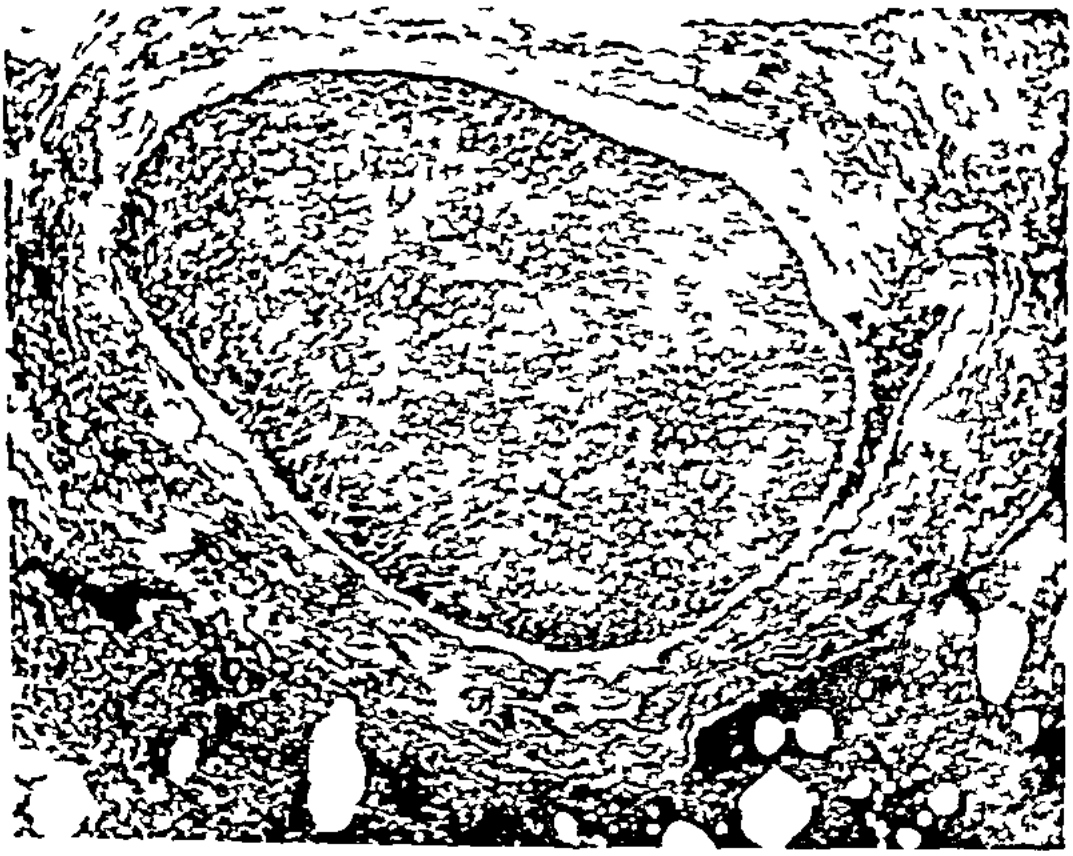


Figure 5 (case 6) Large fragment of liver tissue showing fatty metamorphosis and good lobule pattern in a large pulmonary artery (Armed Forces Institute of Pathology negative no 58422-5) (Hematoxylin and eosin stain ×55)

adhered to a markedly thickened intimal layer The arteries on the 27th day gave no evidence of alteration except for residual thickening of the intimal layer

Two patients in this report had a survival period of a week or more The patient in case 7 lived 7 days after the accident and the liver cells within the fragment were well preserved However there was an added feature—in the center of the fragment were liver cells containing pigment granules Case 9 in which the patient survived for 49 days is most unusual and the findings differ from those in the experimental studies of Lengemann in that the peripheral liver cells were still intact after this length of time Only the center of the fragment had unrecognizable liver cells In addition a portion of the fragment was firmly adherent to the vessel wall This would indicate that the liver fragment may eventually appear as a hyalinized thrombus within the occluded pulmonary artery

Case 10 is of interest in that the pulmonary arteries contained both amniotic fluid emboli and a liver tissue embolus

Clinical Aspects of Chronic Subdural Hematoma

MAJOR FRANCIS J TRUE JR USAFMC

CHRONIC SUBDURAL HEMATOMA in adults is an entity which gives rise to considerable confusion as to diagnosis and regarding which there has been a great deal of argument concerning etiology and pathogenesis Whereas the causal relationship between head trauma and acute subdural hematoma is clearly evident trauma may be slight or inapparent in many cases of chronic subdural hematoma Some cases are stated to have occurred as the result of spontaneous hemorrhage but trauma of some degree is practically always responsible Peet states As a rule the injury is comparatively mild in fact in many cases so slight as to have been entirely forgotten until careful questioning recalled the occurrence A small number of cases not due to trauma can be directly related to a variety of rare causes including ruptured aneurysms blood dyscrasias metastatic or primary neoplasms and thrombosis of cerebral veins or dural sinuses

The clinical picture of chronic subdural hematoma is extremely varied and consequently unless a high index of suspicion is maintained the diagnosis can frequently be missed The importance of making the diagnosis from clinical findings and of performing exploratory trephination to confirm it cannot be overstressed

Chronic subdural hematoma occurs most frequently between the ages of 40 and 60 years probably the greatest incidence lies in the sixth decade The majority of cases have been said to occur in men possibly as the result of a greater liability to head trauma Although chronic subdural hematomas do occur in young adults children and infants the etiologic trauma in such cases is usually obvious and severe in contrast to their occurrence in older age groups So called spontaneous nontraumatic subdural hematoma developing earlier than the fourth decade has apparently not been reported

The clinical picture may vary greatly with the duration of the hema

From the Medical Service of Walter Reed General Hospital Washington DC

toma and with its size and origin Although the usual location of the clot is over the superior aspect of the cerebral hemispheres, a lateral or inferior position and extension to the base are not uncommon [10] Further difficulty in diagnosis occurs because the latent period between the original trauma and the occurrence of symptoms can be extremely variable Munro [9] states that the latent period may vary up to years while Voris [10] feels that the maximum is 3 months

Headache, the symptom most usually present, characteristically will vary considerably during the course of the illness Often it is mild and has no apparent relationship to the location of the hemorrhage itself Nausea and vomiting may occur in some patients and most usually are associated with an exacerbation of headache Drowsiness is frequently present and like the headache tends to vary in its severity during the course of the illness Patients may become comatose and then recover completely only to have a repetition of the episode in a few days The drowsiness may coincide with increased severity of the headache or may be unaccompanied by headache Some individuals suddenly increase their hours of sleep markedly and may be observed to lack ambition and be given to napping during the day Subtle or marked changes in personality may occur, in some patients so slight initially that they go unnoticed by the family and are first observed by an employer or business associate In some patients with severe mental changes the diagnosis of senile dementia or of severe depression may be made Naturally many of these patients are first seen by a psychiatrist and unless the true nature of the condition is recognized they may be considered insane and committed to psychiatric hospitals Delusion of the body scheme due to the presence of a subdural hematoma has been reported by Halloran Convulsions as a symptom of chronic subdural hematoma although uncommon may occur They are usually jacksonian or generalized but temporal-lobe seizures in chronic subdural hematoma have been reported and marked clinical improvement followed surgical intervention

On neurologic examination of patients with chronic subdural hemorrhage the findings are often extremely meager Lateralizing signs may be completely absent or may consist only of slight weakness and slight increase in deep muscle reflexes Occasionally these findings will be on the same side as the lesion and are apparently produced by displacement of the brain by the hematoma with resultant pressure on the opposite cerebral peduncle The lesion itself may produce no symptoms through pressure on the underlying cortex, since presumably it develops slowly and does not actually involve the cortex Symptoms vary during the illness, so may neurologic findings

Funduscopic examination may disclose evidence of increased intracranial pressure as manifested by papilledema usually of minor degree with blurring of the disc margins and absence of venous pulsations Small retinal hemorrhages may sometimes be present The pupils are occasionally unequal with the dilated pupil most often occurring on the side of the lesion In those cases in which the pupillary dilatation occurs on the side opposite the hematoma contralateral herniation of the uncus is probably responsible As in other cases of space occupying lesions involvement of the sixth cranial nerve may occur which is also of no localizing value here Nystagmus and gaze palsies presumably the result of formation of a temporal lobe pressure cone have been reported by Nelson who feels that the presence of signs of brain stem involvement should not contraindicate surgery when other clinical findings warrant the diagnosis of subdural hematoma Strict localization actually is neither particularly necessary nor indicated if the diagnosis has been made since the high incidence of bilateral hematomas makes adequate multiple bilateral trephinations essential

Routine laboratory studies are of no special diagnostic value but lumbar puncture may be of some assistance in making the diagnosis Pressure may be elevated although not often above 300 mm of water but may also be normal or below normal Protein is usually increased and occasionally the fluid may be frankly xanthochromic

Difficulty in making the diagnosis of subdural hematoma because of the inconstant and often contradictory symptomatology has led to a constant search for improved diagnostic adjunct Roentgenograms of the skull may reveal calcification in the membrane of the hematoma or a shift of a calcified pineal gland Ventriculography and arteriography are often helpful but are not a substitute for accurate clinical judgment The roentgenographic findings in both procedures are usually readily interpreted and are pathognomonic in the case of arteriography A specific angiographic pattern of an avascular space adjacent to the cranial vault is seen and in unilateral cases shift of the anterior cerebral artery to the opposite side is usually present The characteristic pattern is seen in anteroposterior views of the arterial phase lateral views are usually of no diagnostic value Ventriculograms will show evidence of a space occupying lesion but in some cases specific conclusions cannot be drawn If exploratory trephination to confirm clinical suspicion has not already been done the procedure of making the bur hole for ventriculography may in some cases disclose the hematoma

Inasmuch as all of the radiologic contrast procedures entail a

certain degree of risk not shared by electroencephalography, there has been sustained interest in the improvement of the latter technic in the diagnosis of subdural hematoma [9] Despite the fact that some subdural hematomas produce a diagnostic picture the EEG findings are extremely variable and in some cases even a normal record may be found In the EEG study of chronic subdural hematoma in experimental animals, Cohn [7] found three types of record, essentially the same types as those noted clinically (1) focal decreased activity (reduced amplitude) over the site of the hematoma, (2) generalized slow waves with a focus of maximum abnormality over the hemorrhage or immediately adjacent areas, and (3) an essentially normal recording in a few cases

The following cases are presented as examples illustrating the clinical findings in chronic subdural hematoma

CASE REPORTS

CASE 1 A K a 60-year old white man began to experience a constant mild generalized headache 3 weeks prior to admission Ten days prior to admission he had complained of severe frontal headache and remained home from work His family noted a marked personality change the patient was severely depressed and inattentive and spoke only occasionally Slight improvement was noted twice but each time the depression and confusion returned On three occasions the patient was incontinent of urine There was no history of trauma to the head and he was not known to be hypertensive

The blood pressure was 140/80 mm Hg Examination of the mental status revealed poor recent and remote memory and poor response to questions Cranial nerve examination revealed a right supranuclear facial paresis Sensory examination disclosed bilateral impairment of tactile discrimination of no other modality Motor power muscle tone and coordination appeared to be normal The deep muscle reflexes were active and equal throughout There was no Hoffmann response in either hand but the plantar response on the right was dorsiflexion

A complete blood count was within normal limits A lumbar tap revealed normal pressure and laboratory studies were normal A 4 mm shift of the pineal to the right was seen the skull film and an electroencephalogram was interpreted as indicative of an extensive lesion on the left anteriorly which was thought to be a neoplasm The provisional diagnosis was frontotemporoparietal glioma

When trephination was performed one Keen's point on the left in preparation for a subdural hematoma was reached On subsequent exploration this hematoma was found to overlie the entire hemisphere and to depress the brain almost 1 cm A smaller hematoma was also found on the right side Following removal of the hematoma the patient made an uneventful recovery and examination one month after operation disclosed no neurologic deficiency and definite memory disorder

This patient presented a picture compatible with the diagnosis of an infiltrating brain tumor At surgery the discovery of a subdural

hematoma came as the sort of agreeable surprise noted by Biemond in whose series 8 of 15 cases of chronic subdural hematoma had been diagnosed preoperatively as cerebral tumor No history of trauma was ever obtained in this patient but as a truck maintenance mechanic he could have had ample opportunity for mild degrees of head trauma

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This case is perhaps not strictly an example of chronic subdural hematoma but of a more acute form which because of the diagnostic problems it presents should be considered in clinical evaluation The possibility exists that this type of subdural hemorrhage is due to rupture of an aneurysm but it was not proven in this case

CASE 3 W R C a 63 ye ll white plai d f m p i t whi l l l b p t f l t y ar H h d l tl d l g f p ecl l pi l f l i l a p u ll f ll d H g n ll alti p i t th [t ll a aid t b lle t Tl n p[t bl t f t u a t th l l l tl p tl t t kn t l hyp f i e

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factory Gait and tation were not remarkable Deep muscle reflexes were hyp active but equal throughout Hoffmann and Babin ki ign were al ent

A com plete blood count and urinaly is were within n rmal limit Skull films were interpreted a norm al An ophthalmol gic exam ination wa nor m al except for ome gener alized c n triction of the vi ual field which was thought to be the result of poor cooperation

A diagno is of evere org inic brain yndr ome etiology unknown was mage and the patient wa ub equently committed to a tate mental ho pital After his death o years later an autopsy revealed an old subdural hematoma covering the anterior portion of the left cerebr al hemi phere Hi t logic examination dis clo ed the hem atoma to be edem at u calcified and partially hyalinized

Subsequent to the autopsy finding of a chronic subdural hematoma, repeated questionin of relatives revealed that the patient had sus tained a dazing blow to the head in an automobile accident approxi mately three months prior to the onset of symptoms It was the impression of the pathologist that the age of the lesion was such that the trauma at the time of the accident could well have been responsible

CASE 4 C R a 3 year old white man had noticed headache for ~ weeks prior to admi ion chiefly in the occipital region but at times frontal mainly on the left side and throbbin~ At fir t they were not evere enough to make him quit work but during the next 3 week he had to go home 2 days out of each week becau e of the headaches Three weeks before he was een the head aches had become very severe and he had been home from work since that time Three days before admi ion the headaches markedly improved During the fir t week of hi illne the patient had two attack in which he lost con cious ne After quitting his job he had tried to do a little work about the house and in an hour became so fatigued that he had to it down He had not tried to do anything since then Durin~ the fir t week of his illne the patient had one episode of vomitin~ For a week before he came to the ho pital he had had difficulty in reading mall print At 1 year f age a serologic te t had been p itive and he had rece ve l two) week cour es of ar enical therapy

The blood pre ure v a 118/ o mm H~ and the general phy ical examination was not remarkable The fundu c pic exam nation revealed early l ilateral papilledema There were n abn r malitie of the cranial ner e Th e only other find ng of note wa an equivocal plantar resp n e on the left

Three bl od Kahn exa inations e e doubtful p itive but the spinal flu d Kahn was 4 plu an l the p nal flu d pr tein was 6 m~ per 100 ml Spinal fluid pre sure was not elevated The EEG had a very g od normal ap earance without any atypical featu e

A ventriculo~ram was attempted on th e right ide and a typical chronic sub-dural hem at ma wa encounte e l pre u ly unsuspected Sub equently other trephinations were perf rm d n the p ite ide but no other hematoma was found The po toperati e c u w une entful The patient s headaches cleared up c mpletely and o di l th e papilledema Five or ix days following the drainage of the ubdural hemat n a there wa a light flare-up in his con liti n n that he level l a few mild en rv jack mian atti el in his left arm an l face Under antic nvul int medicati n the e did not occur again and the p tient a li charged

In thi patient who was below the gener al ge r nge in which

chronic subdural hematoma usually occurs the presence of a luetic infection is thought to be of considerable significance The occurrence of a sensation of moderate to marked fatigue as was noted in this man is frequently noted by patients with chronic subdural hematoma The finding of an essentially normal EEG record should not be interpreted as ruling out chronic subdural hematoma

CASE J M sixty-year-old white male complained of headache of the vertex and occipital region of about 10 days duration prior to admission He also began to experience fatigue and difficulty in buttoning his clothes His appetite had been poor but there had not been any vomiting His bowel habits had remained normal but he had noticed that the patient's right hand was weak and clumsy The blood pressure was 190/110 mm Hg The general physical examination revealed slight generalized arteriosclerosis The pupils were dilated but regular and were poorly dilated The patient was somewhat slow in answering questions but followed simple commands Speech was normal There was weakness of the right hand and arm The deep muscle reflexes were slightly greater on the left than on the right and the plantar responses were suggestive of upward bilateral activity His gait was widened and unsteady The diagnosis of chronic subdural hematoma was considered likely although the possibility of a brain tumor could not be excluded A spinal tap revealed an opening pressure of 200 mm of water but the fluid was clear Multiple trephination was performed on the right side and an extensive subdural hematoma was encountered which was opened with the thickened membranes Multiple trephination was then performed on the left side where a similar hematoma was found and opened Subsequently a fairly large subdural hematoma was found which had not been detectable previously The patient's headache truck his head on the morning of the second week postoperatively and the other set of symptoms

Operative intervention before the occurrence of marked alteration of vital signs is of particular importance in older patients The prognosis is relatively good except where delay has caused the occurrence of complications such as thrombosis of the cortical veins The brain then fails to re expand despite efforts to produce expansion and the outcome is often fatal With deterioration of the ability of this man to respond to questioning it was felt essential that surgery be undertaken immediately and it was successfully carried out

CASE 6 B S a 48 year old white woman had noticed blurring of vision for 3 months prior to admission and bilateral frontal headache of the Oneek's duration the patient had grade 3 papilledema the diagnosis was made and he was the hospital the patient's mental condition was slightly confused She complained of severe headache and vomiting She was afebrile but had a rapid pulse Shortly after admission to the ward she became unresponsive and the pupils were unequal and sluggishly reactive to light Shortly after admission to the ward she became unresponsive and the pupils were unequal and sluggishly reactive to light Ophthalmoscopic examination did not show papilledema A right sided frontal craniotomy was performed and the deep muscle reflexes were hyporeactive

An EEG was interpreted as showing an extensive lesion in the left hemisphere p ibly ne ia tic but it wa thought that a va cular le ion could not l e ruled out A roentgenograjhic examinati n of the kull was norma l A ventriculo gram revealed evidence of a left sided pace-occupying le ion in the fronto-parietal region Routine laboratory studie were within normal limits The pinal fluid was slightly xanthochromic but under n rmal pie sure

The patient underwent a craniotomy with a preliminary diagnosis of left ided brain tumor When the dura was opened a large subdural hematoma was found and evacuated For the first three postoperative days the patient s cour e wa rather tormy The temperature wa elevated to 10 F on ev eral occa ions and on the third po toperative dav the patient had a ri ht sided convulsion Follow ing thi her cour e continued to improve he began talkin in a rational manner and her temperature dimini hed She became pro-gressively more alert and 3 weeks after the operation she was di charged

Although this case differed from the others in the occurrence of sev eral convulsions the variation in severity of symptoms was noted as it was in the other cases Repeated questioning revealed no history of head trauma except a blow to the head incurred in an automobile ac cident 15 years before, which had caused unconsciousness for several hours This injury would not seem related to the subdural hematoma

SUMMARY

The diagnosis of chronic subdural hematoma offers considerable diffi culty because of the variability of symptoms and the latent period which exists between the occasion of trauma and the onset of symp toms Although trauma can practically always be implicated as the causative agent, in some cases it is minimal and the history of trauma is elicited only in retrospect

Six cases are presented to illustrate the clinical aspects of chronic subdural hematoma and to demonstrate possible errors of diagnosis The importance of a high index of suspicion in making the diagnosis and of exploratory trephination to confirm it are emphasized

REFERENCES

1 Scott M Spontaneous subdural hematoma J A M A 141 56–60 Oct 2 1949

Fe d M Contribution à l étude de hé t e ou du aux jonctions *I a a l* 9 –108 Fel 194

3 Ie ry J Subdural hematoma *J A M A* 103 89 –903 Sept 1934

4 Meredith J M Chronic subdural hematoma due to indirect head trauma a r j rt f ce *J Neurosurg* 8 444–447 July 19 1

Grant F C Chronic subdural hematoma *J A M A* 10 84 –849 Sept 14 193

Jeff M M In Bucky S (editor) *Injuries of the Brain and Spinal Cord and Their Coverings* ed 3 New York and Philadelphia Surgical and Medico Legal Publishing Co 31 lustration William and Wilkins Co Baltimore Md 1949 1 1 3

7 Bassett R C and Lemmen I J Subn m l hematoma associated wi
lle ling it rll l n u y J \ rr rq J 443–4 0 S pt 19
8 L udig G H B o\ R, E J a l Wa o R \ Subdural hematom
t ly f 143 a t ed l ri g i pe i l l S g 113 1
191 F b 1941
9 K J E J Hemat ma e tr l al s bd ral and subco ti al An
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J l 171 38 –4 7 Dec 1948
19 Mu D C b l t l r l h t t ly f 310 ifi d a \
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Acute Nonspecific Pericarditis

LIEUTENANT GERALD I SHUCOLI MC, USN
CAPTAIN RUFUS J PEARSON, JR, MC, USN

ACUTE NONSPECIFIC PERICARDITIS appears to be occurring more frequently, at least it is being recognized more frequently Reports[1,2] indicate that the nonspecific variety is the most commonly encountered type of acute pericarditis in a general hospital

In a 3 year period (1955–58), 2[9] cases of acute pericarditis were diagnosed at this hospital This represents a higher incidence than that generally recorded There have been 3 series in the literature containing a larger number, which were collected over a period of 5 to 10 years In 1951 Parker and Cooper reported 22 cases from this hospital prior to the period of this current series The cardinal diagnostic triad of pain, friction rub and specific electrocardiographic change has been present in most of the reported cases Sodeman and Smith, on the other hand, have emphasized the importance of suggestive and nonspecific findings in making the diagnosis

The criteria that have been used as a basis for case selection are absence of a specific cause and one or more of the following (1) specific serial electrocardiographic changes (defined below) (2) pericardial friction rub (3) typical chest pain with either (a) nonspecific T changes in the electrocardiogram, or (b) transient enlargement of the heart shadow on x ray

CLINICAL DATA

The average age of the group was 36 years with a range from 12 to 67 years Fourteen patients (60 percent) were 39 and over Twelve (52 percent) of the cases occurred during the months of June, July, and August Seven (30 percent) patients gave a history of a cold or sore throat preceding the onset of pericarditis by 5 to 14 days

Twenty two (96 percent) patients experienced chest pain which was usually described as substernal or diffuse (table 1) A few described left anterior chest pain, and there was one case each of right anterior chest lower left sternal border and interscapular pain The character

From U S Naval Hospital Bethesda Maryland

T bl 1 *Lo t n of h t p n—22 p t t*

S bst al	8	R ght a t r	1
D ffu p co dial	8	L we l ft te al b rd	1
Left ten r	3	Int rs ap l r	1

of the pain as described by the patient was sharp stabbing or catching in 9 pressing squeezing tightness or heaviness in 7 dull aching or oreness in 3 and not described in 3 In general the on et was sudden in tho e having the sharp or pressure type of pain and more insidious in those having an aching type of pain The patient without pain was admitted with aseptic meningitis and routine electrocardiographic examination showed specific changes with sub equent evolution Pain was markedly aggravated by res piration or cough or both in 15 patients (68 percent) In 7 of these patients there was also aggravation by movement of the trunl and 1 patient de cribed accentuation by movement but not by respiration In the remaining patients no mention was made of any accentuating factors Radiation of pain was described by 16 patients no mention being made in the other 6 (table 2) The most common sites for radia

T bl 2 *R d t n of pa n l of t 22 pat t*

Left h lde d/ m	5	R ght fl k	1
B th hould	5	Elb w	1
N k nd/ j w	5	N e	6
R ght h ulde	1		

tion of the pain were the left shoulder and/or arm both shoulders and the neck and/or jaw Pain radiated to the right flank in one case and to both elbows in another In some patients pain radiated to more than one of the e sites

Although some patients complained only of chest pain (and these were usually the milder cases with the shortest cour es) the majority entered with as ociated symptoms (table 3) Malaise with or without chill and fever was the most common complaint Five patients com plained of dy pnea Le common ere headache stiff neck and arthralgia with one patient each complaining of diarrhea and ab dominal pain The patient with abdominal pain was of interest in

T bl 3 *I d f ted p t g mpt m*

M l	6	St ff n ck	2
Ch ll a d f	5	Arth lgi	
D p	5	D rh	1
H d ch	2	Abd m l p	1

that he initially presented the picture of an acute surgical abdomen and was operated on for acute appendicitis

PHYSICAL EXAMINATION

Only 2 patients were described as appearing acutely ill on admission by virtue of chest pain or associated symptoms or both Seventeen (74 percent) were febrile, although in most cases this was low grade in the range of 100 to 101 F orally Occasionally a peak temperature of 103 F orally was recorded The neck veins were not described in most cases but 5 patients when inclined at least 30 , had prominent pulsations of the cervical veins above the clavicle Hyperemia of the mucous membranes was present in 3 patients Three patients had cervical lymphadenopathy Rales were heard at the left lung base in 3 patients and at both bases in 2 In addition, there were 2 patients with signs of consolidation at the left base (one of whom had cardiac tamponade)

Only 8 patients (35 percent) had a pericardial friction rub which was always to and fro in character In 5 of these the rub was heard on admission, in 1 it was present 3 hours later, and in 2 it was heard between the third and fifth day of illness Auscultation for a rub was repeatedly performed in many of the patients in whom none was heard Of 2 patients with significant paradoxic pulse 1 had acute tamponade Abdominal tenderness and guarding were present in 4 patients

LABORATORY STUDIES

The white blood count on admission was above 10 000 per cu mm in 14 patients (60 percent) with a range of 12 300 to 28 600 In 9 of these the differential count was normal with a shift to the left in the remainder None had leukopenia although 1 (with infectious mononucleosis) had relative lymphocytosis The edimentation rate was elevated on admission or 1 day later in 17 cases (74 percent) Serum glutamic oxaloacetic transaminase determinations were done in 14 patients but were not serially obtained in the majority Elevated levels found in 4 patients were below 100 units except for 1 instance of 107 units This patient was of interest in that he had a severe and protracted course with frequent recurrences of pain and electrocardiographic changes usually associated with repeated though transient transaminase elevations In this patient, the serum glutamic pyruvic transaminase was also determined simultaneously and remained normal

Purified protein derivative (PPD) intermedrate skin tests were done on 15 patients and were positive in 5 Throat cultures in almost

all patients revealed no consistent or significant pattern Blood cul tures were done in a few patients and were sterile Cold agglutinin titers in 2 patients were 1 32 but were not associated with roentgeno graphic evidence of pneumonia The heterophile agglutination titer in 1 patient was diagnostic of infectious mononucleosis this patient is the subject of a separate report Pericardial biopsy on 9 patients revealed only evidence of chronic inflammation of nonspecific nature The patients with a more prolonged course had serial tests for lupus erythematosus factor which were negative

Electrocardiogram

Changes in electrocardiogram considered typical of pericarditis are (1) transient ST elevation in at least 9 usually 3 of the standard limb lead without reciprocal depression (an apically directed S1 vector) (2) transient ST elevation in the lateral precordial leads and (3) inverted T waves in the 3 standard leads and lateral pre cordial leads (superiorly and posteriorly directed T vector) occur ring after return of the ST segments to the isoelectric line

Of 22 patients (96 percent) with abnormal electrocardiograms 11 had ST segment changes considered diagnostic Characteristic T wave changes developed in 6 of these while in 4 others T abnormali ties were less typical The eleventh patient did not develop any T wave abnormality after the ST became isoelectric The direction of the ST vector was usually about 60 with a range from 30 to 90 correlating roughly with the direction of the mean QRS axis In al most all cases the T wave changes appeared after the ST vector dis appeared but in a few the T abnormality appeared earlier The ST vector disappeared in from 2 to 6 days in all but 1 patient in whom it was still present after 9 weeks In some instances the ST segment shifts were slight but their significance was established by their re turn to the isoelectric line in serial tracings

The remaining 11 patients had only T wave abnormalities on their electrocardiograms Of these 6 had characteristic changes and 5 had other changes usually consisting of generalized flattening of the T waves One patient developed transient auricular fibrillation a second an ectopic atrial pacemaker and a third developed frequent premature ventricular contractions in addition to the T wave ab normalitie

One of the 3 patients showed no abnormality in his electrocardio gram despite typical chest pain and a pericardial friction rub

In summary the electrocardiogram was abnormal in 96 percent of the cases half showing diagnostic ST changes

Roentgenogram of the Chest

Unfortunately serial roentgenograms were not done in all patients However 5 patients (22 percent) showed transient enlargement of the cardiac shadow This was slight in 3 and marked in 2, 1 of whom had cardiac tamponade Return to normal size occurred in from 10 days to 6 weeks Pleural effusion was present in 6 cases, left sided in 3, right sided in 1, and bilateral in 2 Parenchymal pulmonary infiltration was present in 4 cases left sided in 3 and right sided in 1

Clinical Course

There were no deaths in this series Most of the cases were relatively mild with pain disappearing within 5 days of onset The degree and duration of fever and the duration of the friction rub correlated well with the clinical course The rub disappeared in from 1 to 5 days in 7 of the 8 patients In 1 it was heard for 40 days This patient had a severe and prolonged course with frequent recurrences and with pericardial effusion and was hospitalized for 5 months The presence or absence of a rub had no correlation with severity

Treatment was symptomatic in almost all cases A few were treated with a broad spectrum antibiotic or with penicillin and streptomycin, but this did not seem to shorten the course of the illness when compared with those treated without antibiotics Prednisone was administered in another hospital to 1 patient with dramatic relief of symptoms disappearance of fever and return of heart size to normal When the steroid was discontinued there was a sudden recrudescence of the original clinical picture including enlargement of the cardiac shadow A second course again produced remission, followed by a second exacerbation when steroid therapy was again gradually discontinued However after this there was gradual spontaneous improvement One patient had evidence of cardiac tamponade and after pericardial aspiration was attempted unsuccessfully he gradually improved spontaneously without specific treatment

Differential Diagnosis

A good idea of the usual differential problem that presents itself initially may be obtained from a listing of the admission diagnoses (table 4) The correct diagnosis headed the list with the impression of myocardial infarction a close second The remainder of the initial impressions illustrate well the varied mode of presentation of a patient with pericarditis

Table 4. Admitting diagnosis—3 patients

Pericarditis	8	Influenza	1
Myocardial infarction	6	Infectious mononucleosis	1
Pleurisy	2	Meningitis	1
Atypical pneumonia	2	Appendicitis	1
Epidemic pleurodynia	1		

DISCUSSION

The relatively short duration of pain fever and disability again emphasizes the benign nature of the disorder. Several of these patients had recurrent episodes but as a group they seem above average in benignity.

The early routine and subsequent repeated use of the electrocardiogram in patients with chest pain is the greatest single factor in the diagnosis of mild or atypical cases. The evanescent nature of the physical signs and electrocardiographic changes suggests that the diagnosis may have been missed in many other patients. As an illustration a 12 year old boy was admitted with a very loud pericardial rub. This disappeared within a few hours and was never heard again although his fever and tachycardia persisted for several days. His electrocardiograms showed only slight transient ST elevations which could easily have been called normal variants since an abnormal T wave never developed.

A 19 year old Negro man had severe abdominal pain initially and laparotomy was performed. This revealed a normal appendix but swollen and inflamed mesenteric lymph nodes. Three days later pericarditis became apparent when he complained of chest pain and the electrocardiogram was characteristic. Mesenteric adenopathy is a possible explanation for the abdominal pain seen in a small percentage of cases although benign peritonitis has been postulated as another explanation. Cervical adenopathy was noted in only 3 patients in our series.

Although this hospital has a busy teaching pediatric service no patient under 19 years of age with nonspecific pericarditis was encountered in a 3 year period.

From table 5 it can be seen that in the majority of patients the diagnosis was established by the presence of pain plus other (usually EKG) change which per se was not diagnostic. These then were cases which might have been undiagnosed without high index of suspicion on the part of earlier examiners. This awareness led to confirmatory serial tests. Repetition particularly of the electrocardiogram is the only means by which many of these cases with slight changes may be given a definitive diagnosis.

Table 5 *Incidence of diagnostic features*

	Author's series		Average from literature
	Number of patients	Percent	Percent
Chest pain	22	96	90
Aggravated by respiration	15	68	75
Friction rub	8	35	70
Electrocardiographic changes	22	96	80–90
Diagnostic	11	48	35–65
Nonspecific	11	48	25–45
X-ray cardiac enlargement	5	22	50–80

The lower incidence in this series of some of the characteristic features when compared with the literature (table 5), is probably a function of the diagnosis of milder cases. It is noteworthy in this regard that only 5 of the 23 patients manifested the classic triad of typical chest pain, pericardial friction rub and characteristic electrocardiographic changes. The reported twofold difference between autopsy and clinical incidence of acute pericarditis can probably be decreased by a higher index of suspicion associated with attention to suggestive and nonspecific findings.

SUMMARY

Twenty-three cases of acute nonspecific pericarditis seen in a 3-year period are reviewed. Pain was the most prominent feature, generally characteristic and present in 22 patients. An abnormal electrocardiogram was present in 22 patients but the changes were diagnostic in only 11. Only 5 of the 23 patients had the classic triad of typical chest pain, pericardial friction rub and characteristic electrocardiographic changes.

REFERENCES

1. Soloman, W. A. and Smith, R. H. Re-evaluation of diagnostic criteria for acute pericarditis. *Arch. Int. Med.* 3: 6–6, 61–6, June 19.
2. Herrman, G. R., Marchand, E. J., Greer, C. H. and Heitmancik, M. R. Pericarditis: Clinical and laboratory data of 130 cases. *Calif. West. Med.* 1: 403–1, Dec. 31, 19. *Heart J.* 43: 641–6, May 19.
3. Carmichael, D. B., Sprague, H. B., Wyma, S. M. and Bland, E. F. Acute nonspecific pericarditis: Clinical laboratory and follow-up consideration. *Circulation* 3: 3–331, Mar. 19.
4. Goyette, E. M. Acute idiopathic pericarditis. *Ann. Int. Med.* 39: 1032–1044, Nov. 19.
Levy, R. L. and Patterson, M. C. Acute serofibrinous pericarditis of undetermined cause: study of cases. *Am. J. Med.* 8: 34–4, Jan. 19.
5. Parker, R. G., Jr. and Cooper, H. R. Acute idiopathic pericarditis. *JAMA* 14: 83–839, Oct. 2, 19.
Shilgoll, G. I. Pericarditis associated with infectious mononucleosis. *Arch. Int. Med.* 100: 630–634, Oct. 19.

Ingrown Toenail A Result of Weight Bearing on Soft Tissue

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INGROWN TOENAIL is an important and frequent cause of loss of duty time in military patients Because the pathologic physiology is not generally understood there are many types of treatment advocated and the recurrence rate is high The term ingrown toenail is unfortunate in that it incriminates the nail as the causative factor and is responsible for the fact that most operative and conservative treatments are directed toward the nail It is our thesis that persons who develop this condition have an unusually wide area of tissue medial and lateral to the nail and that with weight bearing this tissue tends to bulge up around the nail When such persons trim the nails in a curved or rounded fashion instead of straight across further bulging of soft tissue is allowed and as the nail grows out pressure necrosis of soft tissue occurs If our thesis that the fault lies not with the nail but with an excess of soft tissue is correct treatment by removal of a segment of nail is not rational It increases the relative amount of soft tissue and predisposes to recurrence and at the same time inept attempts to remove some nail matrix lead to faulty regrowth of the nail The logical conclusion is that soft tissue should be excised so that with weight bearing there will be no tissue to bulge up around the nail We are not discussing the thick discolored deformed nails seen in old people nor trophic changes fungus infections and excessively curved nails which pinch the soft tissues of the toe These are separate groups in which we usually simply avulse the nail by rolling it from its bed and then apply fungicides or whatever specific therapy is indicated

The Tripler U S Army Hospital records of 99 patients admitted for ingrown toenails between December 1949 and September 1956 have been reviewed Many forms of conservative and palliative surgical treatment were used and although follow up is impossible we know from our current series that recurrence has been frequent

From Tripler U S Army Hospital MIO 438 San Francisco Calif Dr Vandenbos is now at U S Air Force Hospital Italy Mail to Col Bower

Hot soaks, cold soaks, parenteral and topical antibiotics, silver nitrate, and even cautery were used on the painful soft tissues of the toe in an attempt to reduce the inflammation Painful wedging of cotton underneath the edge of the nail so as to relieve the pressure on the soft tissue was often combined with this (fig 1a) Shaving the center or removing a central wedge of the nail was also used to relieve the pressure of the nail upon the soft tissues (fig 1b) In some cases adhesive tape was applied tightly about the toe in an attempt to draw soft tissue away from the nail (fig 1c) In other cases the whole nail was rolled off under local anesthesia (fig 1d), or perhaps a lateral portion of the nail was removed with a special hooked knife (fig 1e) Removing the nail would relieve the patient s symptoms only temporarily and the condition would recur with the regrown nail To reduce the amount of soft tissue on the lateral or medial aspect of the toe, a wedge of normal tissue was removed in a few cases (fig 1f) The most common surgical treatment was excision of the lateral fourth or third of the nail together with the granulation tissue and some of the soft tissue of the toe (fig 1g) Although many patients benefited from this procedure, many had recurrence of their disease when the nail regrew In an attempt to stop regrowth of the lateral or medial portion of the removed nail, the base of that portion of the nail and of its bed was often excised sharply, curetted, or even treated with caustics, in some cases down to and including the periosteum of the bone The common end result was the regrowth of a deformed, thick hooked nail that became as painful as the initial condition (fig 1h)

Since September 1956 we have advocated a more physiologic and sounder surgical approach to the patient with the ingrown toenail Fifty five patients 12 of whom had both great toes involved have been treated as described below

Patients with a severe purulent infection of the soft tissue are treated with local saline soaks or wet dressings and bed rest for a few days until the inflammation has partially subsided Antibiotics are not necessary and have not been used Then under general nitrous oxide and oxygen anesthesia or under field or local procaine block anesthesia the toe is cleansed with soap and water A generous excision of all soft tissue on the involved side of the toe is performed starting at the edge of the normal nail and leaving the nail intact (fig 2a b c) The excision must be generous and adequate, often exposing a portion of the lateral aspect of the distal phalanx of the toe The excision extends at least 0 5 cm behind the level of the base of the nail and is carried out completely to the end of the toe Any

peats this soakin„ 3 to 4 times a day as the wound gradually epithelia lizes from the periphery inw ard Daily bandaging is not necessary In most ca es the patient is able to wear loose fitting shoes within 2 to 3 w eeks The end result is a healed toe with little or no lateral or medial soft tissue and a normal nail (fig 2d)

In an attempt to shorten the convalescent period in a few patients a very short flap of skin was left on the inferior aspect of the excised soft tissue area and this flap w as brought up and sutured down over the wound with one suture near the edge of the nail The thin skin flap became necrotic and sloughed on a few occasions and in a few other cases collections of purulent exudate under the flap occurred delaying the eventual healing process This refinement of the sur gical procedure did not shorten the conv alescent period and has since been abandoned

A complication that required re hospitaliz ation and additional treatment occurred in only 1 of the 50 patients treated To the best of our knowledge there have been no recurrences using our method

CASE REPORT

A 19 year old A my p i t h d bee u bl t p f rm i f nt y duty for 3 m th becau f s u gui i a tu f th ight gr t toe Su gi l



F gu 3 B l t l ngr wn t n l n 19 y ld l l ( ) D l w Cont u d ght to witl no of ft t 10 month f ll w ng mm nd d u g l t tm nt f ng wn n l Left ng wn n l h l g of soft t both m d l nd l t l t th n l t w th w ght be rng th n l w uld be on bu ed n soft t (b) Fnd n w h w ng m d m ti ll tl l k f soft t bulg on ght comp ed w th th o d ng f ft t u on l ft N t th t n l t lly tl m w dth but th l ft pp onl bout h lf w d th ght bec u of th ft t b lg

removal of the medial and lateral soft tissues of the toe was accomplished in September 1957 The patient was returned to duty in 3 weeks He was rehospitalized in April 1958 at which time there was a tender raised keratotic growth 4 mm in height and 1 cm in diameter covering a portion of the medial aspect of the re epithelialized toe The keratotic area was excised and the wound was allowed to re-epithelialize Cultures and microscopic examinations of the removed tissue were unremarkable The patient returned to duty after an additional 32 days of hospitalization In January 1959 the patient was admitted for excision of the soft tissue of the symptomatic left great toe The right great toe had been asymptomatic (fig 3)

There have been no cases of osteomyelitis of the distal phalanx

SUMMARY AND CONCLUSIONS

Ingrown toenail is a phenomenon secondary to weight bearing in persons with excessive soft tissue medial or lateral to the nail border There is no change in the nail itself (excluding fungus infection and other entities not germane to this discussion), and excision of a strip of nail simply increase the relative amount of soft tissue, predisposing to recurrence and nail deformity Based on this thesis, logical surgical treatment would be excision of soft tissue to remove all excess tissue into which the nail could be pushed on weight bearing Such a method has been used with excellent results in 55 patients since September 1956 without known recurrence

REFERENCE

1 JANSEY F Etiologic therapy of ingrowing toenail *Quart Bull Northwestern Univ Med School* 29 358–36 Winter 195

SICK CALL 150 YEARS AGO

The life of the soldier like every other life of irregular exertion and hard hip predisposes to disease while from the nature of the service the treatment of military disease differs from common practice and requires peculiar experience both in preventing the attack and alleviating their cure speedy and complete Having it in mind that military practice requires bold and energetic measures and that the soldier absent on service from duty on the day of actual service is perhaps an irreparable loss to the country hence the necessity of a medical officer possessing superior professional knowledge to others much decision and a good deal of acquired experience —From a letter written in 1808 by Dr Nisbet to His Royal Highness The Duke of York Quoted by Surgeon Major A A Gore in THE STORY OF OUR SERVICES UNDER THE CROWN London 1859 Reprinted from *Journal of the Royal Army Medical Corps* October 1958

A Form for Recording Sigmoidoscopic Examinations of Dysentery Cases

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DURING the study of dysentery among the prisoners of war on Koje Island in Korea from 30 to 100 or more sigmoidoscopic examinations were performed daily Under such conditions it was too time consuming to record the observations by handwritten narratives Furthermore since the therapeutic effects of various drugs were being evaluated it was important to have the observations as standardized and as objective as possible This was particularly pertinent inasmuch as during the seven months of the investigation it was necessary for several persons to perform the examinations As a consequence a form (fig 1) was developed to facilitate the recording of objective observations and to make possible more accurate comparisons between different sigmoidoscopic examinations

In the study of over 2 000 bacillary and amebic dysentery cases the sigmoidoscopic report form proved to be of great assistance in the diagnosis of new cases and in assessing the response to therapy Because it is believed that the form may be applicable to the investigation of other dysentery outbreaks as well as to the study of colitis patients by physicians it is described here as it was used in Korea

SIGMOIDOSCOPIC PROCEDURE

In the Korean study it was not practical to attempt to prepare the patients for sigmoidoscopy by cleansing enemas The patients were asked if they had had a recent bowel movement If not they were instructed to have one and return In the case of pretreatment (diagnostic) examinations of active cases of diarrhea or dysentery there were little or no feces to interfere with the observations.

From the 8th Medical Laboratory Commander 11th Medical Disease Control Attached Command Walter Reed Army Institute of Research Washington D C and Florida State Board of Health Jacksonville Fla

RECORDING SIGMOIDOSCOPIC EXAMINATIONS

RECORD OF
SIGMOIDOSCOPIC EXAMINATION

PATIENT _____ D t _____

PURPOSE D gn (Pr t t) ☐ P t t t ☐ D y ft R _____

DIAG t t ☐ N l th gh t ☐
Col Se ☐ M d t ☐ M ld ☐
H h d ☐ F ☐ P lyp ☐
Oth

LAB E h t N ☐ T ph th RBC ☐ W th t RBC ☐ Cy t ☐
Pu (1 4)_____ Oth P t _____
B t C l I oc _____ Re lt_____

INSERTED T _____ (I) Ob t N ☐ Sp ☐ F ☐ Ed ☐ A t ☐
H d P ☐ F b l ty ☐

COLITIS By d p h	P l 0 4	M d 5 7	D l 8 10	NOTES
FECES (1 4 WLSF)				
EXUDATE N				
Bl od (1 4)				
M (1 4)				
Pu (1 4)				
MUCOSA N l				
Ed (1 4)				
Bl d g (1 4)				
Hyp (1 4)				
P h (1 4)				
E hymo (N)				
G l (1 4)				
F b l y (1 4)				
ULCERS N				
U V l				
I l d (N & mm)				
C fl (1 4)				
Dep h (S D)				
Edg (R F)				
Sh p (R I S)				
S f (XMPBW, CGS)				

EXAMINERS _____

Figure 1 Form for reco ding result of s gmo do copic exam nation

In most instances a scribe recorded the observations upon verbal instructions from the examiner As this was generally done while the sigmoidoscopy was being performed the examiner acquainted himself beforehand with the form in order that he could relate the

observations in the correct sequence With the exception of pre treatment sigmoidoscopies all observations were recorded *before* the examiner referred to the case history or was otherwise informed concerning the patient in order to ensure objective observations and to avoid possibility of bias interfering with the evaluation of the amebicidal drugs Inasmuch as the examinations were performed routinely at weekly intervals and involved a great number of patients it was not possible for the examiner to remember the patients

When a patient entered the sigmoidoscopic tent he handed his case history to the scribe who recorded on the form the patient s identifying information and the purpose of sigmoidoscopic examination If it was a post treatment examination the scribe noted when the therapy was started and recorded the number of days since the first day of treatment

The patient was instructed to lean over an improvised table made by bending the iron frame of a Navy canvas bunk at a 90 angle The table was blocked up to a convenient height for the examiner After a preliminary examination and the application of a water soluble nonmedicated lubricant the sigmoidoscope was inserted just within the anal sphincter The obturator was removed and lens and inflater attached The sigmoidoscope was advanced only under direct vision utilizing air inflation as necessary The proximal area was carefully inspected for evidence of colitis before any trauma produced by the instrument could confuse the picture After the observations for this area were recorded the sigmoidoscope was advanced as far as advisable The depth to which it was inserted was recorded and if it was not advanced to its full depth obstruction was indicated The observations of the medium and distal areas were made while the sigmoidoscope was being advanced but in general they were recorded as the scope was withdrawn and the conditions checked

Material for microscopic examination was aspirated with a 1 ml serological pipet and a 3 ml rubber bulb A cotton swab is decidedly unsatisfactory for obtaining sigmoidoscopic materials to be examined under the microscope Two or more samples were obtained from the most diseased areas observed The material was mixed with saline and examined for organisms and pus Temporary stains of trophozoites were prepared with Quensel or with crystal violet hematoxylin solutions Because the facilities for preparing permanent stained smears are not readily available aspirated material was mixed immediately on a slide with polyvinyl alcohol (PVA) fixative for processing in the United States The amebae in stained PVA films frequently show evidence of motility at the time of fixation (fig 2)



Figure 2 Ent moeba histolytica n sta ned f lm of gmo do copic m t ls p eser ed in poly nyl al ol ol f x t

Sterile cotton swabs on long applicators were used to obtain material for the inoculation of bacterial plates (usually Salmonella shigella and MacConkey's agars) Standard bacteriologic methods were used in the study

SIGMOIDOSCOPIC FORM

Most of the items on the sigmoidoscopic form need little or no explanation (fig 1) To facilitate referring to the accompanying figure in the following discussion the various items will be placed in capital letters or in italics to comply more closely with their appearance on the form The first two lines in reference to the identification of the *PATIENT* and *DURATION* of examination are self explanatory This portion of the form has been changed somewhat from that of the original used in Korea in order to make it more adaptable to other situations

DIAG (diagnosis)—*Unsat* (unsatisfactory) was checked if for any reason it was impossible to observe at least the proximal portion of the bowel The most frequent reason was the presence of feces *Normal throughout* was checked if no colitis was present for the

extent of the bowel observed. In the study of amebiasis cases, in which amebic lesions were rarely found in the median and distal segments and never in the proximal segment *Normal throughout* was checked even when only the proximal area was observed. However, in such cases, the statement "to 4 inches" was inserted. The severity of the *Colitis* under *DIAG* (diagnosis) was not recorded until after the tabulation of *COLITIS Pyo path* had been completed. The degree of severity was determined without reference to the results of the laboratory examination. Because there was such wide variation in the colitis observed it was difficult to establish strict criteria for the terms *Severe Moderate* and *Mild*. Not only the number and severity of the lesions had to be taken into consideration but also the total area of the mucosa which was involved. For example, if the entire proximal area was involved with large confluent bleeding ulcers, *Severe* was checked even though the higher areas might not have been examined. On the other hand, if 20 deep isolated lesions of various sizes and shapes were scattered about in the proximal and median areas, and a few in the distal area again *Severe* was generally checked. If only a few (four or five) smaller lesions were observed in each section the term *Moderate* was checked. *Mild* was checked if the mucosa was hyperemic, lightly edematous and with one or more ecchymotic areas, or if several pinpoint ulcers were observed in one or more sections, or perhaps if only one or two moderately sized ulcers were observed in the 9 inches of the colon. In practice the examiners attempted to record gradations between the three grades of colitis, that is, mild minus, mild plus, moderate minus, moderate plus, severe minus, and severe plus. Since more detailed observations were recorded below, not a great deal of significance was ascribed to the finer grades. The checking of the colitis constituted a brief summary which gave the overall impression of the examiner. The other items under *DIAG* (diagnosis) need no explanation.

LAB (laboratory findings).—After the examination of adequate samples obtained through the sigmoidoscope the appropriate square with reference to *Ent hist* (*Entamoeba histolytica*) was checked. No particular significance was attached to the presence of *E histolytica* trophozoites, *histo* or *histo IPC*. However, the presence of red blood cells helped to document correct identification of the organisms. If identified trophozoites were encountered a question mark was entered in the square *Ent hist*. A brief description and the probable or possible identification were recorded, that is, "immobile trophs, believed to be *E histolytica*." In order to help differentiate be-

tween bacillary and amebic dysentery, an estimate of the amount of pus cells in the microscopic preparation was made If they were too numerous to count, *4* was entered If around 10 were counted in a high dry field, a *1* was recorded The numbers *2* and *3* were used to indicated intermediate estimates of pus cells If bacteriologic cultures were attempted, a check was entered on the appropriate line (*Bact Cult Inoc*), and the number of the plate used was also recorded *Results* of the bacteriologic work were recorded later in the space provided

INSERTED—The distance that the sigmoidoscope was inserted was recorded in inches or centimeters If it was inserted less than 9 inches (23 cm), the obstruction or hazard that prevented further penetration was checked If feces caused the obstruction, the consistency was indicated as *F* for formed, *S* for soft, *L* for loose and *W* for watery *Anat* (anatomic) was used to indicate any anatomic reason which made it impossible to insert the sigmoidoscope further with safety

COLITIS (By depth)—In order to indicate the location of colitis the lower portion of the colon was divided into 3 areas The proximal area extended from the anorectal line for 4 inches (approximately 10 cm) Within this area were generally located Houston's valves usually 3 in number The median area extended from 4 to 7 inches (approximately 10 to 18 cm) The rectosigmoid junction was generally located within the median area The distal area extended from 7 to 9½ inches (approximately 18 to 24 cm) requiring insertion to the full length of the sigmoidoscope The following information was recorded under the columns for the appropriate areas of the colon—*Proximal Median* and *Distal*

FECES—The approximate quantity of feces present in the area was indicated by recording the numbers from *1* to *4* The number *4* indicated that the particular portion of the rectum or sigmoid was filled to such an extent that further observation was not possible The consistency of the stool present was recorded as *F S L* or *W* as indicated above

EXUDATE—If no exudate was observed *None* was checked If *Blood Mucus* and/or *Pus* was observed a number grade from *1* to *4* was recorded The number *4* was understood to represent the maximum amount that might be expected in a given portion of the bowel Since a white membrane (or exudate) frequently covered the amebic ulcers it was sometimes difficult to differentiate true pus In general, the white membrane held tenaciously to the ulcerated area while the pus would slide easily in front of the edge of the sigmoidoscope

MUCOSA—This section of the form usually referred to the condition of the non ulcerated portion of the mucosa If no abnormalities were observed *Normal* was checked All conditions with the exception of *Ecchymoses* were graded from *1* to *4* depending upon the extent of the involvement The degree of *Edema* was difficult to judge particularly in the median and distal portions In the proximal area however the swollen condition of the valves served as a guide The degree of *Bleeding* was determined before the area had had an opportunity to be traumatized by the sigmoidoscope Care was taken to determine whether the bleeding was from deep ulcerated areas if so it was not recorded in this section of the form but below under *ULCERS* Relative to *Hyperemia Petechia* and *Granular* (mucosa) the relative amount of the section involved served as a guide in assigning the grade For example if the entire portion was involved the number *4* was entered The actual number of ecchymotic areas observed was recorded In judging *Friability* both the ulcerated and non ulcerated mucosal areas were taken into consideration

ULCERS—If the section could be examined satisfactorily and no ulcerations were observed *None seen* was checked If feces or exudate made it impossible to observe more than one half of the section *Unsatisfactory* (unsatisfactory visualization) was checked In the squares titled *Isolated (No. & mm.)* the number and size of the isolated ulcers were recorded in millimeters for example 3 ulcers 2 to 15 mm The length rather than the breadth of slit shaped ulcers was indicated If more than 10 isolated ulcers were present in a section 10 plus was recorded The square entitled *Confluent* were used to indicate that the outlines of the ulcerated areas were ill defined or involved a considerable area Such ulcerations might represent several large coalescent ulcers or an extensive ulcerated area which was perhaps superficial The grades *1* to *4* roughly represented the portion of the section involved in the confluence The *Depth* of the ulcers was sometimes difficult to judge since they were frequently covered by a membrane or exudate Those that bled easily were considered to be deep The recorded letters *S* represented shallow and *D* deep If some of the lesions appeared to be shallow and others deep both symbols were recorded On the line labeled *Edge* the letter *I* and *E* were recorded to indicate whether the edges were raised or flat When it was difficult to judge whether the edge was flat or depressed this distinction was not attempted The *Shape* of the ulcers was indicated by the letter *I* for round *I* for irregular and *S*

for slit shaped Combinations of the letters were used to indicate a variety of shapes

On the line labeled *Surface* a combination of letters was used to indicate the character of the exudate or the character of the craters in the ulcer A designated exudate present, *M*—mucus, *P*—pus *B*—blood and *W*—white membrane The predominating type of exudate was recorded first after A that is, *AMB* If the surface or the crater of the ulcer was clean (probably indicating healing), the letter *O* was recorded This letter was followed by *C* (granular) if the center appeared rough and hyperemic, or *S* if the area was smooth

NOTES—In the right hand column of the table under *NOTES*, the examiner could write any additional descriptions or interpretations of the findings relative to the *FECES*, *FLUID STATE*, *MUCOSA*, and *ULCERS*, for example, Although proximal section contained considerable feces the exposed mucosa appeared normal and free of ulcerations or Elevated hyperemic granular mucosa may represent healing slit shaped ulcers After looking at the reports of previous sigmoidoscopies the examiner might comment, "Apparently a relapse—consider treatment with another drug

The names of the individuals performing the sigmoidoscopy and the microscopic examinations for amebae were entered on the line at the bottom of the form

DISCUSSION

Several publications have appeared on various aspects of the investigation of dysentery occurring among Korean prisoners of war in 1951–52 In a number of these it is apparent that the form for recording sigmoidoscopic examinations played an important role in facilitating an otherwise difficult operation The authors of the present paper who were responsible for designing the form believe that it may prove helpful to others performing a significant number of sigmoidoscopies *

In Korea the form was used successfully by many individuals recording the results of over 4 000 examinations In addition to saving much time it provided a means of recording objective observations in a systematic manner which permitted direct comparisons between patients during later analysis In the initial phases of the investigation longhand narrative records were kept All of these were interesting to read because of the enthusiasm

* Persons interested in trying the form may obtain [illegible]

examiner a complete picture was seldom obtained however detailed the report

If carefully performed sigmoidoscopy is a safe procedure for studying dysentery cases even if great numbers of patients are involved In the Korean study approximately 6 0 amebic and 2 000 dysentery cases were examined on several occasions without a single perforation of the bowel Furthermore despite the fragility of some of the intestines there was no evidence that any complications arose as a result of the examinations It should be noted however that the patients involved in this epidemic were generally young adults in good physical condition It was interesting that only occasionally polyps very few hemorrhoids and no fissures or other abnormalities were encountered

During the investigation it was thought that the white exudate or membrane over the amebic ulcers represented the presence of deep lesions for aspirated material from these lesions teemed with amebae This interpretation was probably incorrect in some instances especially in view of the recent observations of Juniper Steele and Chester that in rectal biopsies of apparently similar lesions the organisms were concentrated in the exudate over a rather superficial type of ulceration

Sigmoidoscopy has the distinct advantage of assuring the correct identification of material obtained for microscopic examination There is no opportunity for substitution of specimens by noncooperative patients and little chance of labeling errors It is also a procedure adaptable to handling large numbers of patients during the investigation of dysentery epidemics It cannot compete with the anal swab technic for obtaining large numbers of bacterial cultures but it has other advantages in that it affords a better and frequently an immediate appraisal of the patient s condition By sigmoidoscopy information can be obtained for the differential diagnosis of dysentery In addition to the satisfactory material obtained for bacterial cultures the type of lesions in the colon wall and the presence or absence of pus and *E histolytica* help the physician decide whether the patient has bacillary or amebic dysentery Sigmoidoscopy is a definite aid in the diagnosis of amebiasis According to Manson Bahr and Muggleton biopsy specimens obtained through the sigmoidoscope can be examined unstained for the differentiation of various types of colitis

Nevertheless sigmoidoscopy should not be looked upon as a primary method of obtaining fecal material for parasitologic examinations In acute cases of amebiasis when large active trophozoites are avail

able in the rectosigmoid region, the material obtained through the sigmoidoscope is usually adequate for rapid confirmation of amebic dysentery But in nondysenteric cases, when less typical trophozoites and cysts are present the limited quantity of material obtainable and the production line speed of the sigmoidoscopy routine generally make the parasitologic examinations unsatisfactory Furthermore, it should be remembered that even in acute amebiasis sigmoidoscopy may be inadequate because it fails to reach the regions of the colon most frequently involved (cecum and ascending colon) In most instances the examination of normally passed or cathartic stool specimens should precede the sigmoidoscopic examination [3] The opportunity to utilize multiple procedures, such as concentration technics and permanently stained smears, and to examine the preparations without pressure may confirm the diagnosis of amebiasis where sigmoidoscopy might fail In any event whenever sigmoidoscopy is used in the diagnosis or study of dysentery cases, it is believed that a standard form such as the one described here will be found helpful in recording objective observations made through the sigmoidoscope and the results of microscopic and bacteriologic examinations

SUMMARY

A reporting form is described which was used to record the results of the sigmoidoscopic examinations of over 2 000 dysentery cases during an epidemic in Korea The form facilitated the recording of objective observations and thus permitted more accurate comparisons to be drawn between the results of different examinations It is felt that the form may be found useful by others in their study of colitis cases

REFERENCES

1 Frye, W W Brooke M M and Weinstein P Antibiotics in treatment of acute amoebic dysentery *Annals New York Acad Sc* 1104–1113 Dec 30 19

2 Hardy A V Mason R P and Martin G A Antibiotics in acute bacillary dysentery *Amer J Trop Med* 10 0–10 4 Dec 30 19

3 Martin G A Carfinkel, B T Brooke M M Weinstein P P and Frye W W Comparative efficacy of amebicides and antibiotics in acute amebic dysentery used alone and in combination in 638 cases *J A M A* 151 1055–1059 Mar 15 1953

4 Carfinkel, B T Martin C A Watt J Payne F J Mason R P and Hardy A V Antibiotics in acute bacillary dysentery observations in 1408 cases with positive culture *J A M A* 151 11–119 April 4 1953

Swellengrebel N H Studies on human intestinal protozoa especially with regard to their dependability and connexion between their distribution and hygienic conditions *Acta med Scandinav* (suppl) 70 1–115 Oct 1936

6 V T C A W INS EIN P P and OTTO G F Stain f the rapid d ff t t f t pho t f inte t l m b i f h t p epa ati A *J T op M d* 30 43– 1 Ja 19 0
B K M M d GOLD t N M P lyvinyl lc h l fi at a pr e ati e d, dh e f p t in dy t lc st ol a d th liquid mat l *J L b & Cl Mcd* 34 1 4 1 60 No 1949
8 W P P GA FI K B T nd M ER M M T eat e t f c e f b l til ldy e t y with te amy i *A J T p M d* 1 980–981 N 19
9 B OOKE, M M S RT R, C P YNE F J W I I P d F YE, W W I t t al pa it ury y f K e p f wa amp *U S Ar d F M J* 7 08–714 May 1956
10 JUNI K J S EELE, V W a d C R, C L Rectal b p i di g f n b l ti S *tl MJ* 1 45– 3 M y 19 8
11 A p o H H B ICK W L a l J H H G Ameb i I th l gy D g d Cl m th py Cha le C Th m Publi h Sp i g fi l l Ill 1953
1 M B I d Mt V W J R tal b p y d t di gn f f b ly t y a l allied di ea e f l n *L t* 63– 6 Ap 13 1
13 L OOK M M *A b s —M tl d L bo t y D g* C mm l abl D C t D p tm t f H lth Fd t a l W lfare P bl H alth S i Atl t G 19 8

COMMON SENSE IN THE ARCTIC

M t f th u t f l f ithi th A ctl Ant tlc Ci l t lay i ply pl it l g g e t dang with y mi t t tl i f e c th t ny a d e e y wh w k th a i t ɹid d t m n dedi t d t h w k th t not th h ibl en o t d t him f t N e e Tl d m n o k g th liff r t f m t we ha j b l Middlet wn U S.A F ce A t li th ha th i i th n th J t h l n l th t it fe t n i t tion wh n th l ght g ee th h th i l ly ∿ f ty ɹ ec ɹt Th t ɹ t l l c ll th mm n e b t i c thi com n lit i ɹpa t ft l fte ɹl at h m i i fly T l th m ity e h t d t ce q t mil t b ɹ ɹ d f dd l t n by t m Th f r t ll t me h with him gh f l f l a d t th f t l t e e l day f l l t d t y p t k p wa m k ɹ fed d b all keep b y O it m f mm ∿ t t t k n dl h — ft ll we would not t y t l hi h f l df l le l d ɹit th ock ɹh a l k thi l ll th t —C pt AL D M E MC I AR Th A ti — \ I l To Li d W k (ed t ial) *l M A l l f f l M d* J ly 19 9

Reiter's Syndrome

Report of 16 Cases 8 of Which Followed Treatment for Gonorrhea

CAPTAIN PHILIP R STEINMETZ, MC, USAR
CAPTAIN JAMES P GREEN, MC, USAR

THE CLINICAL TRIAD of urethritis, arthritis, and conjunctivitis is usually referred to as Reiter's syndrome after the case described by Reiter[1] in 1916 It occurs almost exclusively in men and represents a common form of arthritis in young male adults

During the past 3 years 16 caucasian servicemen were admitted to this medical center with the clinical picture of Reiter's syndrome In this report the syndrome will be discussed with attention to the characteristics of its onset and the implications for its pathogenesis

MATERIAL AND METHOD

All 16 patients were enlisted men in the U S Armed Forces in Europe Their age varied from 19 to 33 years with an average of 22 Only 1 of the 16 men was married

The patients received their initial medical care at the dispensaries Usually this concerned the urethritis and sometimes the conjunctivitis Hospitalization became necessary in all cases with the advent of arthritis Some patients were admitted directly to this medical center others were transferred from smaller Army or Navy hospitals The average hospitalization at this hospital was 2 months Four patients recovered sufficiently to return to their duty station in Europe The remaining patients were evacuated to the United States either because they needed further convalescence and rehabilitation or because they had completed their overseas tour

The two cases reported here are examples of the clinical and the laboratory features of the syndrome

All included cases had at least three features of Reiter's syndrome Twelve patients had the classic triad with or without additional

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f4- and white bl l ll t f 1 3.0 p c t m t ti n m l d ffe ti l Th ed me tati n t 6 m e h The ant t pt l t t w ne at r A t e og am f th he t d th elect d g m w norm l Th i the h p t l f g l l y He ec i d phys cal the apy l gi f0 f l ed l e dail f tl e fi t w k fte whi h th d g l ll d l t 30 da ly Tl e eth iti a d b l iti l d d J u y 19 8 d tl j ctiv t i arl F b a r By the l f Feb t y tl e l e bject e i f a th iti a d th p ed i l e was d o t ed Tl jat nt tu ed t duty on 1 Ma ch 19 8

H w s f f y t m fo 9 k u til 1 May h n h l l l edn n l bu i i l th y d th l t e The ophtl al l i t n ted

T bl 1 *S q n f nt n 16 p t t tl R t ynd m*

C	A (years)	*T I t l* S ual G rrh R -e p ur Fi t F t f s d m d Third	Add ti l
		d y → d → d y → d → d y →	
1	24	S — 3 — GU — 18 R — 2 — NSU — 8 — C — 4 — A	M t
	33	S — 2 — GU — 8 ——— A — 1 — M t	
3	20	S — 3 — GU — ——— NSU — 12 — C — 9 — A	M t
4	1	S — f w — GU — f ——— A — f w — C	
5		S — f w — GU — 90 ?R ——— A — f w — C	
6	1	S — — GU — 8 ——— M t — 0 — A — 40 — NSU	
	9	— f — GU — 8 ——— C — 0 — f t — — A	
8	1	S — — GU (m l l f g) —— A — — C — 4 — NSU	
9	19	S ——— 1 ——— N U — — C — 7 — A	R currence
10	20	S ——— ——— C — 1 — A — 3 — NSU	M t
11	2	S ——— 30 ——— NSU — 17 — C — 1 — A	
12	2	S ——— 3 ——— NSU — 11 — A — 0 — M t	
13	2?	S ——— A — 5 — N U — 5 — C	
4	21	S ——— NSU — 21 — C — 0 — A	f
5	20	Diarrh ——— 11 —— C — — A — — M t	
16	26	S — 195 GU & A 1953 NSU & A 1954 NSU & A & C 9 5 ——— ?R ——— NSU — f w — A	

S se ual po re
R= e-expos re
A arthritis
C co uncti i ts
GU—g rrh al ur th itis
NSU nonsp ifi reth i is
M t m cocut us l ions
(k tod rmia and/ b lanitis ir inata)

b l t al e nj cti t a d n i iti th ght a l l itt d tl p tie t to th h p tal 23 Ma On 1 J e th p ti t d elope l b l iti i t th tim w th t u th t u l p At time h mpla ed f a th lg No f k th t d l p d B th d f J h g n p t lly ymptm ti The f d y b f hu h d l d d h g h ged i ew xu l d e t e d eek d f Fo d y l t h h l t p lent u th iti hi h p ed t be g h l It po ded ll t th d es f 600 g (600 000 it) f p ocai pe i ll li Th ft it y l m did n t fi up The pati t w mi t mati t a f ll p x t pte b 19 8

RESULTS

The first patient had a gonorrheal urethritis which subsided uneventfully after treatment However, 20 days later (2 days after another sexual exposure) he developed a nonspecific urethritis followed 8 days later by a conjunctivitis and shortly thereafter by arthritis, keratoderma, and balanitis circinata A recurrence of nonspecific urethritis commonly, as in this patient, ushered in the full syndrome in the post gonorrheal group of patients

The second patient (No 9 of the table) developed a nonspecific urethritis 3 weeks after exual exposure Eighteen days later he had the classic triad He recovered completely over a 4 month period Then 9 weeks after recovery the syndrome recurred allegedly without sexual re exposure The relapse was less classic It consisted of bilateral conjunctivitis, unilateral uritis, balantis circinata, and arthralgias which did not progress to frank arthritis The acute gonorrheal urethritis which developed at the end of the econd episode of Reiter s syndrome was considered a fresh infection contracted during a new exposure It reflected the frequency of promiscuous relations in the group of cases beginning with a nonspecific urethritis No third bout of the syndrome was precipitated

The sequence of events in all cases is briefly outlined in the table

Urethritis was commonly but not necessarily the first feature The urethral discharge varied from a thin watery fluid to a yellowish, thick material The conjunctivitis occurred next It was transient or persistent with exacerbations during the course of the syndrome In two instances it was complicated by a unilateral uritis

There was no set time for the occurrence of arthritis It usually involved two or three joints The knees and ankles were most commonly affected less frequently the wrists elbows metacarpophalangeal and sacroiliac joints In the average case the arthritis was sudden in onset asymmetrical and severe for several weeks It often was accompanied by atrophy of the adjacent muscle particularly of the quadriceps muscles

Mucocutaneous lesions such as balanitis circinata and lesions of the skin clinically identical with keratosis blennorrhagica occurred in two thirds of the patients The cutaneous eruptions involved the soles the palms the scrotum and sometimes the trunk For their description we refer to Albert and Crone who from a dermatologic point of view described cases 2 and 3 of table 1

Extramarital sexual exposure preceded the syndrome in most cases Only one patient denied any exposure interestingly enough the only one who had diarrhea Twelve patients had had sexual contact from

2 to 30 days before the onset of symptoms In three cases such contact was likely although the data were incomplete The time intervals and the information about exposure or re exposure should be considered with some reserve as they depend on the truthfulness and the cooperation of the patient

The laboratory studies commonly revealed a leukocytosis an elevated sedimentation rate and pyuria Negative findings were of more importance than positive ones No specific organisms were found in the urethral and conjunctival exudate at the time of arthritis The joint fluid was sterile in all cases The electrocardiographic findings were within normal limits The Rose test and the latex agglutination test were negative in seven cases Facilities were not available for the gonococcus complement fixation test

Once the triad was established the differential diagnosis was not difficult The mucocutaneous and the joint manifestations were fairly characteristic in their appearance distribution and course The arthritis usually lasted several months the keratoderma several weeks They could be easily distinguished from the manifestations of a drug reaction Rheumatoid arthritis at times entered into the differential diagnosis especially early in the disease in patients who did not yet exhibit the full triad or in patients who never developed more than urethritis and arthritis The latter group was difficult to classify and had to be excluded from this series although a number of these cases might have belonged to the Reiter s syndrome

The natural course of the disease appeared relatively benign Even with severe arthritis and muscle wasting recovery was the rule after from 2 to 5 months The recurrence rate could not be evaluated in our series One patient had a past history of at least three attacks of Reiter s syndrome another one developed a recurrence in this theater

Treatment consisted of intensive physical therapy salicylates and a generous diet Steroid therapy was used in half of the patients It was somewhat more effective than the salicylates in the acute phase of arthritis yet it did not seem to shorten the duration of the disease Improvement from cortisone prednisolone or corticotropin was shorter than that from salicylates A course of penicillin and streptomycin sulfate was given to several of the patients without appreciable effect

DISCUSSION

Arthritis has been known as a complication of dysentery since the 5th century when Caelius Aurelianus used the description rheumatismus intestinali cum ulcere Brodie in 1818 presented a number of cases having the triad of urethritis conjunctivitis and arthritis

and stated that the di ease could occu independently from gonorrheal infection In 1850 he de cribed a case in which the syndrome recurred nine times In 1916 Fiessinger and Leroy [5] reported on an outbreal of dysentery among soldiers in Northern France In four of them the convalescence was complicated by a 'syndrome conjonctivo uretro synovial They made the ob ervation that the manifestations were abacterial whereas Reiter [1] who reported his case in the same year, attributed the symptoms to a spirochetosis Paronen [6] studied 344 cases from 1943 to 1946 during an epidemic of Flexner dysentery in Finland

The syndrome usually has been considered a result of infection, either enteric or venereal The incidence of diarrhea as a forerunner of the disea e has varied considerably in different series Marche [7] estimated that about 80 per cent of the ca es seen in France and North Africa begin with an enteric phase and 20 percent with a urethral phase In most series in the English literature the enteric pha e is le s common Hollander [8] observed diarrhea in only 9 out of 53 cases Hall and Finegold [9] in 5 of 23 cases Only 1 out of 16 patients in the present series had a gastroenteritis The other 15 had a urethritis preceded by extramarital sexual exposure (known in 1 likely in 2)

The role of pleuropneumonia like organisms in Reiter s syndrome is not yet clarified for these organi ms do not fulfill Koch s postulates for a causative agent Hall and Finegold i olated pleuropneumonia like organisms from the urethral exudate of only 1 of 8 patients examined In our ca es we were unable to demonstrate the organism in any of 6 patients Negative culture results in previous series (including our own) hould be regarded with some re erve however for Shepard and Peoples and associates found that there are strains with such fastidious growth requirements that they can be mi sed easily when a routine pleuropneumonia like organism agar is u ed

Although the theory that Reiter s yndrome is a venereal infection is strong in view of the hi h rate of extra exposure there are some disturbing time factors The po t exposure interval varied from 2 to 41 days in the Hall and Finegold ca es and from 2 to at least 30 days in ours Such variability is hardly consistent with the incu bation time of a contagious di ea e Furthermore the propensity to cyclic recurrences indicate that the di ea e is not followed by im munity but more likely by a hypersensitive state The recurrences run a elf limited cour e and certainly do not re emble the exacerba tions of a slowly progre ive infection

The hypothesis that the syndrome has an allergic origin has received consideration especially in the postdysenteric cases This theory could explain the time features and also provide a common denominator for the postenteric and the posturethritic forms

The role of gonorrhea has been controversial Characteristically the urethral and conjunctival discharge as well as the joint fluid in Reiter's syndrome are negative for gonococci yet many times a gonorrhea is complicated by abacterial manifestations indistinguishable from the pure Reiter's syndrome In our experience the triad was the same whether it followed a nonspecific urethritis or a gonorrheal urethritis that became abacterial with treatment Eight of the 16 patients had a recent and 2 an old history of gonorrhea Conka found a history of gonorrhea within 3 months of onset of the triad in about half of his patients Was the occurrence of gonorrhea coincidental or etiologically significant? For example could the syndrome be caused by sensitization and subsequent reexposure to gonococci or their breakdown products? Nowadays with the ubiquity of antibiotics exposure to dead or dying gonococci could occur easily without actual contraction of gonorrhea

Unfortunately serologic studies have been of little help in establishing an etiologic relationship with either the gonococcus or the dysentery bacillus and the allergic theory is as unproved as the infectious one

Another concept indicates that microorganisms may persist in the host in an altered form which may escape detection A number of bacteria are known to be able to undergo a metamorphosis into much smaller particles the so called L forms of bacteria This transformation tends to occur under adverse conditions either natural or artificial as in the presence of penicillin The gonococcus and the dysentery bacillus are among the bacteria which have been observed in the L phase There is a great similarity in morphology between L forms of bacteria and pleuropneumonia like organisms yet the origin of the latter and the relationship between the two is not clarified Little is known about the pathogenicity of these L forms or about the response of the host to their presence The phenomenon that bacteria may play dead or persist in an atypical form may in time alter our views on infection and bacterial allergy

That Reiter's syndrome in spite of its obscure cause originates from rather well defined clinical circumstances provides an opportunity for bacteriologic study An understanding of its pathogenesis may in turn contribute to the knowledge of more common joint diseases

SUMMARY

Sixteen cases of Reiter s syndrome are briefly reported, in 1 of which a venereal origin was likely Eight patients developed the syndrome after treatment for gonorrheal urethritis The post gonorrheal syndrome did not differ from the pure Reiter s syndrome Factors of possible importance in the pathogenesis are reviewed

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REFERENCES

1 Reiter H Ueber eine bisher unerkannte Spirochaeten Infektion (Spirochaetosis arthriticus) *Deutsche med Wschnschr* 42 1535–1536 Dec 14 1916

2 Albert J and Crone R I Keratosis blennorrhagica (Reiter s disease?) and its treatment *A M A Arch Dermat* 9 581–586 May 1924

3 Caelius Aurelianus Cited in Manson Bahr, P *The Dysenteric Disorders* 3d edition Williams & Wilkins Co Baltimore Md 1941 p 71

4 Brodie B C *Pathological and Surgical Observations on Diseases of the Joints* Longmans Green & Co New York N Y 1818 (1st edition) 1850 (5th edition)

Fiessinger N and Leroy E Contribution à l etude d une épidemie de dysenterie dans la Somme *Bull et mem Soc méd d hôp de Paris* 40 2050–2069 Dec 8 1916

6 Paronen I Reiter s disease study of 344 cases observed in Finland *Acta med Scandinav* (suppl 12) 131 1–114 1948

Marchf J La place du syndrome de Fiessinger Leroy Reiter dans le cadre des maladies rhumatismales et de la pathologie générale *Rhumatologie* 6 245–247 Nov–Dec 1954

8 Hollander J L Abrams N R and others (editors) *Comroe s Arthritis and Allied Conditions* 7th edition Lea & Febiger Philadelphia Pa 1943 II 1194–1251

9 Hall W H and Kinsold S Study of 3 cases of Reiter syndrome *Ann Int Med* 38 333–350 Mar 1953

10 Shepard M C Transmission of pleuropneumonia like organism *J Bact* 71 305–309 Mar 1956

11 Peoples D M Morton H E and Pfo L G Unusual pleuropneumonia like organism isolated in a study of trichomonas vaginalis from cases of chronic urethritis *J Bact* 73 398–401 Feb 1957

12 Walther G Nachkrankheiten in der Ruhrrekonvaleszenz als Ausdruck allergischer Vorgange *Munchen med Wschnschr* 88 581–586 Apr 4 1941

13 Csonka G W Course of Reiter s syndrome *Brit M J* No 4909 1088–1090 May 10 1958

14 Dienes L and Weinberger, H J L forms of bacteria *Bact Rev* 15 245–288 Dec 1951

15 McDermott W Microbial persistence *Yale J Biol & Med* 30 257–291 1958

Human Plasma Steroid and Electrolyte Concentrations Between 0800 and 1600 Hours

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WHEN it is essential that two blood samples be drawn from each subject in an experiment it becomes mandatory that the effect of the blood letting procedures upon the variables under study be thoroughly understood If the time interval between samples is of considerable length it then becomes necessary to recognize the possibility of diurnal and emotional responses inherent in such a sampling method

It was the purpose of the present study to determine whether significant changes occurred in certain blood constituents as a consequence of a 4 hour sampling procedure

PROCEDURE

Venous blood samples were collected from a total of 400 healthy male subjects ranging in age from 18 to 22 years Between 18 and 20 subjects were sampled daily and within these groups homogeneity was strict as to diet physical activity and emotional exposure Two 35 ml blood samples were taken from each subject with a 4 hour interval between samplings The earliest samples were collected at 0800 hours and the latest were drawn at 1000 thus overlap was present only in the 1200 hour group All subjects were at least 3 hours post prandial The heparinized blood samples were centrifuged immediately and the separated plasma stored by freezing

Plasma total 17 hydroxycorticoid (17 OHCS) determinations were carried out by the method of Peddy and associates as modified by Pricmore Shannon and Feller Concentration of sodium and potassium were determined with a Beckman DU flame photometer (spectral energy recording adapter photomultiplier) utilizing a

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hydrogen oxygen flame Working standards were prepared as serial dilutions from a stock standard containing sodium 144 mEq/liter potassium 5 mEq/liter, calcium 5 mEq/liter phosphorous 2 2 mEq/liter, and magnesium 2 mEq/liter All samples and standards were adjusted to a final 1 0 percent trichloroacetic acid concentration

RESULTS AND DISCUSSION

An analysis of variance was performed on the data for each variable from each of the time groups to determine whether changes occurred in the concentrations of 17 OHCS, sodium, and potassium from the time the first sample was taken to the time of the second sampling 4 hours later The results of these analyses are given in tables 1 to 3 In addition, an analysis of variance was performed for each variable

Table 1 *Plasma total Hydrocortico Iconcentration between 0800 hour and 1600 hours*

Timing ps	Subj	Mean 17 OHCS concentration (g mm per 100 ml)		SD	P
		First trial	Second trial		
0800-1200 hour	50	41 19	38 63	12 30	NS
0900-1300 hours	45	4.. 44	41 51	1 91	NS
1000-1400 hours	35	36 19	44 49	15 76	< 05
1100-1500 h	43	35 8	39 52	8 56	< 05
1200-1600 h	46	43 23	44 06	12 08	NS
		SD	1 45	15 6	
		P	NS	NS	

Probability that the analysis of variance

Table 2 *Plasma sodium concentration between 0800 hours and 1600 hours*

Timing p	Subj	Mean sodium concentration (mEq/liter)		D	I
		First trial	Second trial		
0800-1200 h	95	144 4	145	1 6	< 01
0900-1300 hrs	10	144 4	145 5	01	< 01
1000-1400 hrs	90	145 0	145 9	22	< 01
1100-1500 hrs	11	144 8	146	14	< 01
1200-1600 h	9	143 5	144 6	09	< 01
		D	4 1	4 3	
		P	NS	< 05	

Probability that the analysis of variance

REFFRENCFS

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DANCERS OF UNSUPERVISED DIETING

It is u f t t th t ur e t f l f eight du tion a d pt d t y m ny indi i l al l I ib tl i wn di t h adhe e to ti l di t tl t l tl ed t l q ick e ult Th la ge f v l nta y an l u upe vi d li tl g i th I bl f th ln li id l l l y i la h l l h e re g th j l ti ffect f ati i tl n i t n f ti t l e ltl V de f tl jh l l t ai f di t ng th pl y lc h ld e l th i h t otl l t a n B l r tl t Tl d f j ecij it t g fr k j y h J th h i j l l ti g h l l t l u d ted It tand t th t f i li id l h l a u ed tl a n ecl i f d f se l tl t gr w bese int na f the ight i f t ll in p t u ttll n l tl h b *f i l C t i ly h ll l l ang f li t j t j lated* tl co j l e f f l t tl in li i l l p ti t l l l b t d l A ld l l i l t ty i ly l k fl t d i ly ffect tl p ti t i t pe so l rel ti l ips—I y h log I t rv i D tı y Ch n *I y l t B ll i* Sp g 1J)

Health Survey of the Trust Territory of the Pacific Islands

ALICE M HETZEL, B S

IN THE SUMMER of 1948 the U S S *Whidbey* began the voyage from island to island that, before its completion, was to take it through the Caroline Islands the Marshall Islands and the Northern Mariana Islands Under the auspices of the United States Navy, a survey staff aboard the *Whidbey* was undertaking a survey of health and sanitary conditions The ultimate goal of the survey was a physical examination of every inhabitant

These islands with the exception of Guam in the Marianas, then designated as the Trust Territory of the Pacific Islands (fig 1), were the former Japanese mandated islands Invaded and occupied by American military forces during World War II responsibility for civil administration of the islands was placed with the Navy pending the enactment of legislation by Congress designating the permanent governing authority Under direction of the Secretary of the Navy the Commander in Chief of the Pacific Fleet served as High Commissioner of the trust territory

The trusteeship agreement of the United Nations directed the United States to care for and improve the health of the inhabitants It was recognized immediately that a broad general health service policy must be established to meet the need for improvement of the health and hygiene in the islands As a result of the war the natives were in a state of emotional shock They had been displaced from their homes their food had been confiscated trade and industry had been abandoned and schools were nonexistent Medical needs had long been neglected The islanders a primitive people who had been exposed to the diseases of civilization against which they had no racial immunity were unable to support doctors dentists and nurses in private practice or to maintain hospitals dispensaries, or departments of public health

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From Medical Statistics Division Bureau of Medicine and Surgery Department of the Navy Washington D C

One of the main difficulties encountered in developing a public health program for the trust territory was the lack of reliable information concerning health and sanitation conditions The most reliable reports came from the naval dispensaries where natives living in the immediate vicinity were given medical care and treatment There was definite indication from these reports that certain diseases were affecting the health of the islanders and that sanitation in general was on a very low level Without a comprehensive survey however a correct appraisal of disease prevalence morbidity and sanitation problems could not be made

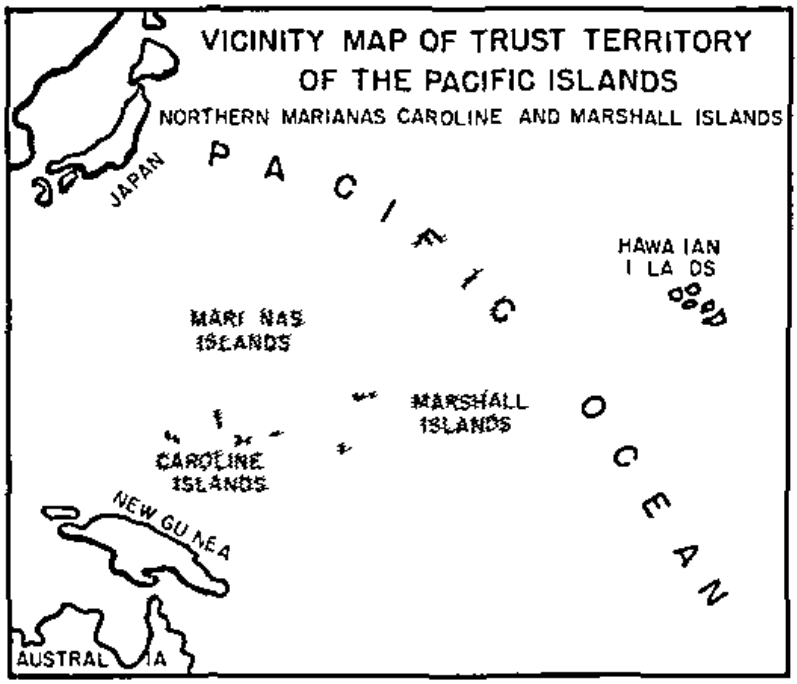


Figure 1 The Trust Territory of the Pacific Islands.

Motivated by these considerations the Navy undertook a health survey of the trust territory to determine the public health problems of the indigenous population The U S S *Whidbey* converted especially for the survey was a twin screw diesel driven 174 foot vessel displacing 930 tons The *Whidbey* was equipped with a photofluorographic unit and facilities for complete physical and dental examinations The survey was begun in the Marshall Islands area on 1 August 1948 Four officers and 41 enlisted men made up the ship's company The survey staff was comprised of the following personnel Medical Corps officer 1 Dental Corps and 1 Medical Service Corps officer 3 hospital corpsmen serving in laboratory x ray dental operating and clerical activities

Traveling from island to island the survey group examined every native present and investigated and evaluated the food, water, sewage, and garbage facilities, as well as the general living conditions and native habits and customs that had a bearing on the subject of health and sanitation. Among other things the survey included a physical examination, photofluorographic examination of the chest, Kahn test, tuberculin skin test and stool examination. This report concerns those islands surveyed by the U.S.S. *Whidbey* during the period from August 1948 through June 1950. Three of the trust territory civil administrative districts, those of Palau, Saipan, and the Marshall Islands, are represented. All of the western Caroline Islands, the northern Mariana Islands (except Alamagan and Agrihan Islands) and the eastern islands of the Marshall Islands group are included.

Subsequent to June 1950 the U.S.S. *Whidbey* also surveyed the Truk and Ponape districts. However, data for these districts corresponding to those for the three districts mentioned before are relatively incomplete. As a consequence, it is impossible to present a comprehensive description of the health status of the population in the trust territory as a whole. The fragmentary data available for Truk and Ponape, while not included in this article, are contained in a detailed study in the Bishop Museum, Honolulu, Hawaii, and the Bureau of Medicine and Surgery, Department of the Navy.

POPULATION CHARACTERISTICS

The total native population of the trust territory was placed at approximately 54,300 in 1950. About 28,000 of these were in the three districts of Palau, Saipan, and the Marshall Islands. The population figures presented in the accompanying tables totaling 22,146 for these three districts are based upon the number of identification cards distributed during the survey. One card was distributed to each inhabitant present on the island at the time of the visit of the U.S.S. *Whidbey*. Although it was intended that every inhabitant be included, the length of time involved in making a survey of this nature, coupled with the fact that there was a great deal of interisland visiting, resulted in some individuals being examined at places away from their home island and others not receiving any examination at all. The area of the island, the scattering of the population, the terrain, and the amount of control exercised over their people by the local chiefs or administrative heads were all factors affecting the extent to which the population was brought into the survey.

Density. Population density varied from island to island. Out of 39 islands or atolls, 9 had a population of less than 100, 24 had a

population between 100 and 400 and 10 had a population of 500 or more In this latter group were Saipan Babelthuap Yap Koror *Majuro and Kwajalein all with over 1 000 inhabitants*

Area was no indication of population In terms of size some of the larger islands were very sparsely populated Tinian and Pota for instance while nearly as large as Saipan had much smaller popu lations On one of the tiny islands with an area of less than 1 square mile the population density was far greater than on the larger island Population density in terms of overall area was misleading in numer ous instances for on many of the larger islands only a very small area was inhabitable This was especially true on the volcanic islands where much of the island was too rocky to be inhabited The result was a concentration of population in a very small area with an ex tremely high population density while the rest of the island had few or no inhabitants at all

Table 1 shows by district *the number of females probably pregnant at* the time of the health survey Estimated annual birth rates based on the figures are also shown For comparative purposes in the United States in 1949 birth rate per 1 000 estimated female population be tween the ages of 15 to 44 were as follows all race 106 2 white 102 6 and nonwhite 126 4

Age distribution The median age for the three districts combined was 20 Over one third of the population was under 15 years of

T bl 1 *Estimated Fertility of Pregnancy by District*

Population	Total	Saipan District	Palau District	Trust Territory District
	Number			
Total	22,146	4,993	1,555	6,572
Female 15 to 44 years of	4,138	1,036	416	96
Female pregnant at time of survey	407	119	12	13
	Annual birth rate per 1,000*			
Total	21.4	31.7	19.2	77.3
Female 15 to 44 years of	130.8	153.2	83.9	29.4

Estimated pregnancies will terminate in births Rates based on survey population

age, and approximately one fifth was 45 years of age or over It should be borne in mind that most ages were estimated by an interpreter, as very few native knew their own age

The age distribution in the Saipan district presented the most youthful pattern of population found in the territory The median age was 17 3 as compared with 20 5 for the Palau district and 23 6 for the Marshall Islands district Only part of the Marshall Islands district is included in this study Statistics were available for about two thirds of the inhabited islands of the district accounting for over 70 percent of the population

Age distributions for the islands or atolls of the Marshall Islands and Saipan districts were relatively consistent In the Palau district, however, there was considerable variation Merir Sonsorol, and Tobi had the highest proportion of old people There was a strong tendency on the part of the young people of these islands to leave for homes elsewhere while the older people remained Of Merir s 11 inhabitants only 3 were under 45 years of age Approximately 70 percent of Sonsorol s population of 111 was 45 years of age and over, and almost one third of the total had reached or passed the 65 year mark On Tobi 60 percent of the 128 inhabitants had reached or passed 45 years of age At the other extreme were Koror Eauripik and Rota each of which has only 10 percent in the 45 year and over age group

The median age of 22 8 years for Tinian Island appeared high as compared with Saipan and Rota in the same district There were two groups of inhabitants on Tinian the Yap Chamorros and the patients at the leprosarium The latter group was composed mainly of middle aged and old people There were no small children at the colony Infants born at the leprosarium were sent to Saipan immediately and cared for at the hospital until they were adopted The median age for the leprosarium patient was 53 4 years while that for the Yap Chamorros was 16 6 years the second lowest in these districts

An unusual situation existed on Fulo Anna Fourteen of the sixteen inhabitants were members of one family the chief his mother two brothers two sisters two young Indonesian girl the wives of his two brothers and 9 children

Marital status The traditional marriage customs with their large gatherings feasts and exchanges of property were still practiced throughout the territory Missionary influence had made its imprint on marriage customs and many marriages were being performed with church sanction

Earlier marriages for women than for men resulted in a much higher proportion of married females than males in the 15 to 19 year age group 30.2 percent for female as compared with 4 7 percent for males In all age groups up to 45 years of age with the exception of Palau s 35– to 44 year age group there were proportionately more married females than males The reverse was true without exception for tho e 45 years of age and over

Height and weight The inhabitants of the trust territory were of medium stature and weight In the adult age groups the average height ranged from 5 feet 2 inches to 5 feet 6 inches for males and from 4 feet 11 inches to 5 feet 1 inch for females The avera$_g$e weight for males was from 133 to 145 pounds and for females from 112 to 135 pound.

Height and weight varied by district For a given height the in habitants of Saipan and Palau were heavier than those in the Marshall Island with Saipan having a slight edge over Palau in this re pect (table 2) The difference was more marked for females than for males It may be noted in table 3 that the inhabitants of Saipan were slightly taller than those of the other two districts In Palau males were noticeably shorter than in Saipan and the Marshall Islands.

Blood pressure readings Blood pressure readings were taken for over 60 percent of the population Only one reading was taken for each individual and all readings were taken routinely during the course of the examination

T bl 2 *A g ce ght by h ght d of 41 yea g g o p*

H i ht (in h) and e	ipa district	Pala district	Marshall I lands di trict
	A rag w ight (pound)		
60 t 62			
Mal	130.8	128.5	122.4
Femal	134.4	1?6.2	123 5
63 t 65			
Mal	13 9	13? 7	135 3
F mal	149 3	135.9	133.1
66 t 68			
Mal	150.0	14 6	142.9
F mal	( )	(*)	( )
69 ?1			
Mal	164.4	159 2	160.9
F m l	(*)	(*)	( )

f mal 65 in h in h igh

Table 3 *Average height by age group and sex*

Age group (years)	Saipan district		Palau district		Marshall Islands district	
	Male	Female	Male	Female	Male	Female
10 to 14	53 4	54 7	5 4	53 3	54 8	54 9
15 to 19	63 4	61 1	61 8	59 5	63 1	59 1
20 to 24	65 8	61 2	64 4	60 2	65 4	59 8
25 to 34	65 4	60 9	64 7	60 1	65 8	59 6
35 to 44	65 6	60 8	64 2	59 9	65 1	60 0
45 to 64	64 8	60 4	63 6	59 2	64 6	59 8
65 and over	63 1	59 1	62 2	5 9	63 5	58

No generalizations may be made for the trust territory as a whole with respect to variations in median blood pressure readings Variations followed no consistent pattern in the districts As normally expected, median blood pressure readings increased with age This increase was most rapid in the Saipan district The median systolic and diastolic readings were generally higher for males than for females, with the smallest difference between sexes occurring in the Marshall Islands (table 4)

Table 4 *Median systolic and diastolic blood pressure by age group and sex*

District and sex	15 to 1 age group (years)		5 to 44 age group (years)		45 and age group (years)	
	Systolic	Diastolic	Systolic	Diastolic	Systolic	Diastolic
Saipan						
Male	119	69	124	6	135	80
Female	113	0	115	73	132	79
Palau						
Male	118	0	122	74	125	75
Female	117	69	119	70	122	73
Marshall Island						
Male	116	6	118	7	125	8
Female	113	74	117	6	130	9

DISEASE PREVALENCE

American occupation forces found the health of the islanders generally poor and their needs for medical and surgical care extremely pressing The conditions under which the native population had been forced to live during World War II, wartime diets of low calorie content, and the inadequacy of medical treatment received prior to and during the war had all left their mark

By the time the health survey was launched however health conditions were much improved The islanders had received medical care on an emergency basis immediately following American occupation in 1945 until July 1947 when the territory passed from military government to civil administration In 1946 the health service policy of the Navy for the Trust Territory of the Pacific Islands outlining a health program for the trust territory was adopted for the purpose of controlling preventable disease and rendering medical and dental care By 1 August 1948 the date the health survey started this program was in full operation and rapid strides had been made in the control of preventable disease Measures to correct sanitary practices of the islanders were being enforced treatments inoculations and vaccinations had been administered and the food supply had been improved to the extent that malnutrition no longer existed except in a few areas Diseases that were previously the most serious threats had been brought under control In many respects the health survey served as a means of evaluating the health program

A marked reduction in the prevalence of intestinal parasites was accomplished in the interval prior to the health survey It is believed that at the time of the American occupation nearly 100 percent of the indigenous population was infested with hookworm Ascaris and Trichuris were also extremely prevalent As a result of a mass deworming program the control of flies and education regarding health habits sanitation and particularly the use of sanitary latrines the prevalence of intestinal parasites had been noticeably reduced throughout the trust territory

Yaws is another disease that was brought under control with effective treatment The large number of inhabitants exhibiting multiple scars and the high proportion of positive Kahn tests bear testimony to the wide spread prevalence of yaws Very few primary lesions were noted during this survey however as these had been virtually eradicated by extensive treatment with penicillin administered by Navy medical officers on field trips prior to the survey

The findings of the health survey revealed however that certain sanitation problems still remained Most islands had community latrines that in general were clean and in good repair It was evident however that use of the beaches was still a common practice throughout the island In many places leaves and coconut fiber used in lieu of toilet paper were thrown about promiscuously Malodorous stagnant pools usually place where no latrines were available but many [illegible] constructed latrines that were seldom used [illegible] virtually every household had its own

latrine use of the beach was evident Garbage was usually buried in pits but on some islands it was burned or carried out to sea and dumped The most inadequate methods of garbage disposal were noted on Utirik Atoll and Namorik Atoll where the garbage was allowed to accumulate over long periods of time

In general the fresh water supply for the islands was furnished by rainfall This was supplemented by well wherever possible and, on the high islands springs streams ponds and reservoirs were also utilized Rainwater was collected in old oil drums by means of spouts and drums on houses and coconut trees The water was then stored in the drums often without covers or other safeguards against debris There were indications that the water supply on the following islands or atolls was contaminated Babelthuap Palau Yamotrel Yap Tinian Ebon Kwajalein Majuro Mili Maloelap, Namorik and Ormed Most wells were contaminated and the natives were warned to boil water before using it On Saipan Island all water was chlorinated

FINDINGS OF HEALTH SURVEY

Stool examinations Stool examinations were made for 2,202 inhabitants of the Saipan district 4,384 of the Palau district and 490 of the Marshall Islands district approximately 45 percent of the combined population As shown in table 3 52.4 percent of all stools examined were positive for intestinal parasites One out of every five positive stools showed evidence of multiple species The highest proportion of positives occurred among children from 5 to 14 years of age

Comparison of the three districts reveals that Saipan had the highest proportion of positive examinations 79.3 percent as com

Table 3 *Percentage of stool positive for intestinal parasites by age group and sex*

Age group (years)	Percent positive			
	Total	Saipan district	Palau district	Marshall Islands district
All ages	52.4	79.3	64.5	19.3
Male	53.5	79.5	64.9	18.9
Female	51.4	79.1	64	19.6
Under 5	4.7	4.6	51.6	20.9
5 to 14	60.3	88	68.8	23.6
15 to 44	49.8	76.4	65.3	16.1
45 to 64	51.4	—	64.9	16.0
65 and over	51.5	4.4	65	1.4

pared with 64 5 percent for P lau nd a much lower percentage of 19 3 for the Marshall Islands On the following islands or atolls less than 5 percent of the stool examinations were positive Ngulu Lib Aur Mejit Likiep Utirik Tabal and Kwajalein Over 45 percent of the tool examinations were positive on Eauripik Namorik Saipan Elato Timian Kayangel Babuldep Woleai Satawal Ifalik and Lamotrek (table 6)

Table 6. Distribution of land by percentage of stool specimens found positive for helminth parasites

Percentage of positive stools	Total number of islands	Saipan district	Palau district	Marshall Islands district
Under 5	8		2	6
5 to 9	4			4
10 to 24	4		1	3
25 to 49	5	1	4	
50 to 74	7		5	2
75 and	11	2	8	1

The most prevalent intestinal parasites were hookworm Trichuris or whipworm and Ascaris or roundworm Hookworm was found in 93 1 percent of the stools Trichuris in 27 3 percent and Ascaris in 17 9 percent The relative importance of the three species varied from district to district In the Saipan district Ascaris had the greatest prevalence with Trichuris ranking second and hookworm third The rank order in the Palau district was just the reverse while in the Marshall Islands district Trichuris was the most prevalent hookworm ranked second and Ascaris was practically nonexistent (table 7)

Table 7. Percentage of positive stools by parasite infection

Parasitic infection	Percent positive			
	Total	Saipan district	Palau district	Marshall Islands district
All parasites	82 4	79 3	64 5	19 3
Hookworm	23 1	26 2	34 0	6 8
Trichuris	27 3	40 6	22 0	11 0
Ascaris	2	44 2	16 8	3
Other	2	5 6	1 4	2 9

Variations of prevalence rates by age and sex were slightly different for each species Hookworm and Ascaris show opposite tendencies with respect to age The former increased with age while the latter decreased Trichuris showed little change by age Hookworm was more prevalent among males, while Trichuris and Ascaris had slightly higher rates among females

The actual procedure of obtaining the sample of stool specimens resulted in a haphazard rather than a representative cross section of the population Each individual examined was given a stool box and requested to submit a fecal specimen The number of specimens obtained varied greatly After the specimens were received some had to be rejected because of contamination from the specimen wrappings and others because of inadequacy of the specimen The remaining specimens were examined for ova of the helminth or platyhelminth group On some of the specimens examinations were made for protozoa Stools were examined by the simple flotation technic with a concentrated sugar solution used for ova of helminths and flukes Direct normal saline smears were used to determine the presence of protozoan cysts When protozoan cysts were indicated by the smears iron hematoxylin stains were made for positive identification

Kahn tests Kahn tests were given to 16,3-0 inhabitants, nearly three fourths of the population of the Saipan, Palau and Marshall Islands districts The Kahn test technic was not uniform throughout the portion of the survey reported here Originally the three tube test was utilized Later using this same Kahn antigen, only the second dilution was used Approximately 50 percent of the Kahn tests were positive, with little difference between the sexes (tables 8 and 9) The Palau district had by far the highest proportion of positives—6o 4 percent as compared with 38 1 percent for the Marshall Islands district and 30 4 percent for the Saipan district

Wide variation occurred among the islands paralleling the variation between the districts Tabal Island in the Marshall Islands

Table 8 *Distribution of islands by percent of positive Kahn reaction*

Percent positive Kahns	Total number of islands	Saipan district	Palau district	Marshall Islands district
Under 25		1		1
25 to 49	1		6	11
50 to 74	13	2		4
75 and			7	

Table 9. Percentage distribution of positive Kahn tests by age group

Age group (years)	Percent positive			
	Total	Saipan district	Palau district	Marshall Islands district
All ages	50.1	30.4	65.4	38.1
Under 5	3.6	41.0	61.3	18.9
5 to 14	4.9	18.3	65.0	5.9
15 to 24	49.5	33.7	66.4	3.4
25 to 44	53.8	36.7	66.3	43.0
45 and over	5.9	3.0	63.9	4.0

district had the lowest percentage of all, only 3.6 percent positive. The next lowest was Saipan Island with 9.8 percent. At the other extreme was Flato Atoll in the Palau district, the only place where every individual tested had a positive reaction. Other islands or atolls where over 70 percent of the population had positive reactions were Kayangel (95.4), Satawal (92.9), Woleai (89.1), Peleliu (87.0), Lamotrek (84.9), and Faraulep (67.3), all in the Palau district.

Generally speaking, the proportion of positive reactions increased with age up to the age group of 45 and over, where a slight decline was noted. The same rate of increase from age group to age group however was not observed in each district. In the Saipan district a marked increase occurred between the *5 to 14* and *15 to 24 year age* groups with little change in the age groups thereafter. The conspicuously high rate for Saipan's under 5 years of age population however is based on only 39 tests. Very little variation is observed between the age groups in the Palau district. On the other hand the Marshall Islands district exhibits definite increases with each age group.

In this survey a positive Kahn test was considered likely evidence of the presence of yaws infection. It is recognized that the Kahn test is far from being an infallible index for the prevalence of yaws for a positive reaction to the test may result from many diseases and conditions. Because malaria was not noted in this area and because syphilis, leprosy, and infectious mononucleosis seldom occurred in proportion to the number of positive Kahn tests, it would appear to be a reliable guide in this instance.

Yaws is not only believed a venereal disease but is a contagious disease that may be transmitted from person to person by

direct contact or carried by flies The spirochete causing yaws, *Treponema pertenue*, enters through open lesions such as scratches and minor cuts The primary lesions appear most frequently on the lower extremities and may last from 3 months to 3 years It is not unusual for old healed over lesions to break down Tertiary stage lesions often cause severe scarring and, in the form of gangosa sometimes completely destroy the features

Many inhabitants had multiple scars as evidence of a history of yaws Very few diagnoses of active yaws were established during the course of the health survey As shown in table 10, most of these cases were found in the Marshall Islands district Numerous cases of active yaws were suspected but dark field examinations of the lesions were negative, possibly due to local treatment of ulcerative lesions with merthiolate and mercuric ointments by the native health aides

Table 10 ***Results of survey for active yaws Spanish Palau and Marshall Islands district***

District and island	Number of cases	District and island	Number of cases
Total	3	Marshalls	
		Majuro Island	8
Palau		Maloelap Atoll	7
		Ailuk Atoll	4
Babelthuap Island	1	Arno Island	3
Koror Island	1	Likiep Atoll	3
		Wotje Atoll	3
Marshalls	71	Kwajalein Atoll	2
		Namorik Island	2
Jaluit Island	1	Tabal Island	2
Ebon Atoll	11	Utirik Atoll	2
Maloelap Atoll	11	Libal Island	1

Note All cases yaws reported from the Spanish district

During the survey (table 11) urogenital examinations were made only of the male population as the women were reluctant to permit examination Little or no acute urethritis from gonococcus was noted but although cases were not reported on the health record, medical officers at some of the hospitals stated that among the women there were many cases of salpingitis gonococcic and "cervicitis, acute due to gonococcus The presenting symptoms of the reportedly widespread gonococcal infection among the men were those of a nongonococcic urethritis Syphilis was almost nonexistent, a condition found to parallel the prevalence of yaws Very few cases of primary chancre were found and secondary skin manifestations oc

T bl 11 *R lt of y f yph l d g o h S pa P l d M h ll I l d d t t*

Dist i t d isla d ll	Syphilis	G rrh
T tal mbe f case	6	12
P l		2
k ro I l d		1
Y p I land		1
M h ll I l d	6	10
All k At ll		1
Arn I land	1	1
Ebo At ll	1	
k j lein At ll		3
M j At ll	4	4
\ m ik I land		1

\ se f yphilis rrh p d t th S ip dis i t

curred infrequently among both men and women Several cases of syphilis and gonorrhea were reported from the Majuro and Kwajalein Atoll but only an occasional case was reported from any of the other islands or atolls

Che t x ray examinations Chest roentgenograms were made of approximately 8? percent of the population of the Saipan Palau and Marshall Islands districts (tables 1? and 13) Many of tho e not

T 11 12 *R lt of l t y m n t on*

X-ray findings	T t l		S ip distri t		P l d l t		M h ll I l d dist l	
	\ mbe	P rce t	\ mbe	Perce	\ mbe	P ce t	\ mbe	P ce t
X-ra mina ns	15 094	100 0	4, 226	100 0	8 733	100 0	5 135	100 0
All he t d fects	817	4 5	230	5 4	389	4 4	199	3 9
T be cul l pul m ary	26	1 5	85	2.0	141	1 6	41	8
Mod tely and far-ad anced	94	5	2		53		17	3
O her ac l	14	8	44	1 0	1	9	??	4
\ d	?6	1	1	4		1	2	0
Ch or	31		7	2	1		7	1
Card sc l orm l		3	11	3	11	1	26	5
B ne d f m		2	3	1	2		2?	5
O her	3?	4		2.9	21	2.5	98	2

Table 13 *Results of chest x ray survey for active pulmonary tuberculosis by age group*

Age group (years)	Active by x ray							
	Total		Saipan district		Palau district		Marshall Islands district	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
All ages	241	1 3	68	1 6	134	1 5	39	0 7
Under 5	5	5	3	8		0	2	6
5 to 14	15	3	5	4	8	4	2	2
15 to 24	39	1 1	16	2 0	17	1 1	6	5
25 to 44	6	1 2	17	1 5	43	1 5	7	5
45 and	115	3	27	4 4	66	3 5	2	2 0

x rayed were aged and infirm The initial examination consisted of a 35 mm photofluorographic roentgenogram that, if the x ray shadows were suspiciously abnormal, was followed by a 14 by 17 inch chest roentgenogram The findings reported in this survey were made from the 14 by 17 inch films without further clinical study

On the basis of these examinations 4 5 percent of those x rayed were found to have chest defects and 1 8 percent were suspected of having active pulmonary tuberculosis The number of chest tumors cardiovascular abnormalities and bone deformities was negligible none being over 0 3 percent of the total x rayed

The prevalence rates for active pulmonary tuberculosis increase with age showing but little variation by sex The proportion of active pulmonary tuberculosis suspects among those x rayed is greatest for those 45 years of age and over, 3 2 percent as compared with the next highest rate of 1 2 percent for the 25 to 44 year age group Only slight differences were noted between rates for both sexes the overall rate for females exceeding that for males by 0 1 percent

Of the three districts Saipan has the highest percentage of chest defects with Palau ranking second and the Marshall Islands lowest of all 5 4 4 4 and 3 9 percent respectively Of the persons x rayed only 0 7 percent in the Marshall Islands 1 5 percent in Palau, and 1 6 percent in Saipan were recorded as being suspected of having active pulmonary tuberculosis

On the basis of the chest roentgenograms performed (table 14) 10 islands had no active pulmonary tuberculosis On the other islands the percentage of positive films for the x rayed population ranged from Kwajalein s 0 1 to Faraulep s 6 8 On six of these islands or

T bl 14 *P t g of ch t x d t f t p lmo y t b l ty k o l o l t d l d o t ll S p P l l M h ll I l l l t t*

I l d ll d d t i t	P t ll	I l l ll d d i t	P ce t l
F l p A ll	6 8	W tje At ll	1 2
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1 I l 1	3 6	M I land	
L m k At ll	3 5	B bel h p I l 1	
T b l I l d	3 4	S t w l I l 1	6
I I l d	3 1	Eb At ll	4
Mill A ll	2 9	All k At ll	3
F l I l 1	8	N m ik I l 1	3
Y p I l d	2 8	K j l l At ll	1
A I l d	2 4	A g I l 1	0
K or I land	2 4	E ur pik At ll	
I loel p At ll	2 2	Lib I land	0
K l A ll	2 1	L ki p A ll	
Ngul At ll	2 1	I l I l 1	
T I I l 1	1	F l l L l 1	0
If lik A ll	1 7	P l A I l d	
p I l d	1 6	T bl I land	
l l A ll	1 3	U l bl A ll	0
Arn I l d	1 2	U t ik A ll	
R I t	1 2		

F l di t
f h ll I land s di i
fp dis le

atoll Ine Tabal Lamotrek Son orol Flato and Faraulep over 3 percent of the x rayed population had active pulmonary tuberculo is

An interesting experience wa reported from Tabal Island The U S S ll *Hidbey* visited this i land in November 1948 but lecau e heavy ea rendered the x ray machine inoperable the ship was forced to return at a later date to complete the examination Durin the initial visit one 59 year old woman on the i land showed clinical evi dence of pulmonary tuberculo is and had positive sputum for tubercle bacilli At that time nine people were livin in the same hou e with the active ca e of pulmonary tuberculo i Eighteen months later when the urvey ship returned the woman had died of tuberculosi The che t roentgeno rams for the other nine members of the house hold were still ne ative for tuberculo is

Table 1 hows the diagno e of tuberculo is that occurred among i habitants ho were not x rayed The e diagno e had been e tab li h d prior t the health urvey and in ome ca e the individual i rec iv in tr atment for the di a e

N ly 90 per ent of the population were tuberculin te ted Table 1f h th di tribution of i land by percent of po itive tuberculin

Table 15 *Distribution of tuberculin reactors*

District of residence	Tuberculin							
	Total tested	Positive		Doubtful	Lymphoid	Miliary	Bone	Other
		Adult	Child					
Total	44	9	3	6	14	1	1	10
Ship to ship								
Island	6	1			1			
Palau	33	4	3	3	13	1	1	8
Babelthuap Island	4	1		1	1			1
Fais Island	1							1
Koror Island	4				3			1
Ngulu Atoll	1					1		
Philippine Islands								
to Yap Island	1				1			
Saipan Island	1	1						
Yap Island	19		3		8		1	3
Marshall Islands	5	4		1				
Ailuk Atoll		1		1				
Kwajalein Atoll	1	1						
Majuro Atoll	1	1						
Tobolair Island	1	1						

tests Two test strength dosages of tuberculin 0 0001 mg PPD and 0 00002 mg PPD were used for the tests the latter dosage being used early in the program and occasionally when the 0 0001 mg PPD dosage was not available On most of the islands in the Marshall Islands district the 0 0001 mg PPD dosage was used while primarily the 0 00002 mg dosage was used in the Palau district Both dosages were used in the Saipan district From Babelthuap Island where the *0 0001* mg PPD tuberculin dosage was used on about one half of the tested population and the 0 00002 mg PPD tuberculin dosage was

Table 16 *Distribution of positive tuberculin test by age*

Age at positive test	Total	Saipan District	Palau District	Marshall Islands District
0 to 9	3		1	
10 to 19	6			6
20 to 29			3	4
30 to 39		1	3	4
40 to 49	3	1		
50 to	6	1	5	
60 to 69	4		4	
70 to 79	1		1	
80 to	1		1	

abnormalities and bone deformities was negligible The incidence was 0 3 percent or less of the total number of inhabitants x rayed

The general physical examinations disclosed that the most prevalent diseases were skin diseases diseases of the eye and respiratory diseases Leprosy was also of major importance Other diseases of wide prevalence were degenerative joint disease neoplastic disease rickets and vitamin deficiencies anemia and inflammatory diseases of the ear

ACKNOWLEDGMENT Thi p t s made p ibl by ma y p son withi the Bu au f Medici an l Su g y D p t ent f the Na y h o trib ted t the i itiat n le el i nt d ccompli h nt f th h lth rvey it elf nd mo p ifically by the pe on el f th n edi l tati tics di i i n wh o painstaki ly p ce ed th data Th auth i e pe i lly indebt d t D W \ Ch ter di e t f tl e Divi i n f r po hi f th tudy t Mr Lo is P Hellm deputy di t r f r hi g idance d in aluabl ug g ti an l t M Il le R l f t a i ipt i i ati The p fes i nal lvi lati g t tl e ll t n pect f tl l t that w g ne ly r i l l t i l f tl i ti i li l li i i i gr t f lly a k le lged

REFERENCES

1 H NDB K TI T L T ITO Y I CIFIC I L DS N vy D p rt m nt Office f the Chi f f N al Ope ti W hi gt D C 1948
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PROGRESS IN DIABETES

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Case Reports

Localization of Spinal Cord Injury in a Deep Sea Diver

LIEUTENANT WALTER L. TAYLOR, JR., MC, USN
LIEUTENANT GEORGE W. SANTO, MC, USNR
CAPTAIN ALBERT R. BEHNKE, MC, USN (RET.)

THIS CASE REPORT illustrates the occurrence and persistence of a specific localized lesion of the spinal cord following inadequate decompression of a diver. The fact that delayed recompression appears to have been of some benefit is noteworthy.

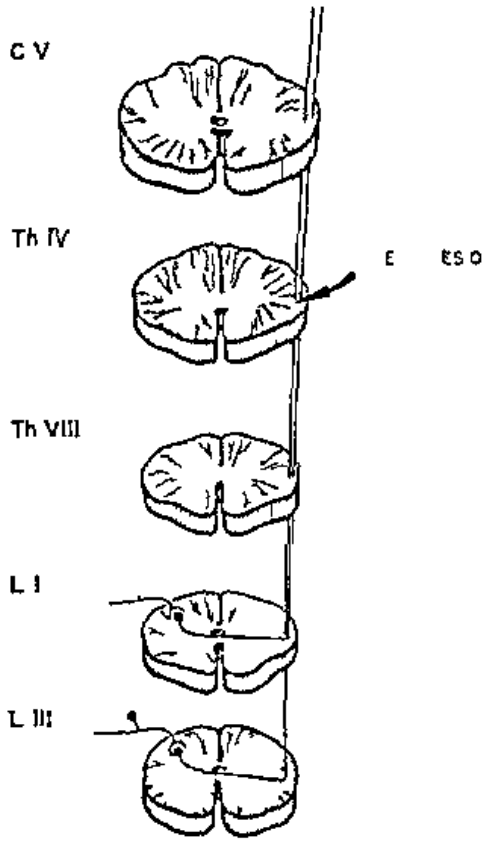
Behnke[1] has estimated that up to 5 percent of decompression injuries in deep sea diving and about 2 percent in caisson workers give rise to symptoms referable to the presence of intravascular or extravascular nascent gas bubbles. The most common type of injury is the peripheral crampfree pain known as bends. Occasionally, the nervous system is involved. This serious type of injury has received careful evaluation in an excellent monograph by Haymaker and Johnson.

CASE REPORT

On 4 March 1958 a 29-year-old commercial diver made two five minute dives to a depth of about 130 feet. The ascent from the first dive was rapid with no stage decompression. The ascent from the second dive was controlled and there was an 8-minute stop at a depth of 10 feet. Each dive was about 20 minutes long with an interval between dives of about 1 hour. Immediately after coming to the surface following the second dive the patient experienced dizziness, nausea, generalized aching, weakness of the left arm and leg and numbness of the right side. He went to bed and after a sound sleep awoke free of symptoms except for persistent numbness on the right side of his body and muscular weakness of the left side. In addition he felt a slight stiffness and tenderness at the base of his neck. There were no bladder symptoms.

The patient was first examined 2 days after the injury. Physical findings were unremarkable except for the neurologic examination. There was localized

From U. S. Naval Radiological Defense Laboratory, San Francisco, Calif.



F gu 2 I thw y f th l ftl t l
p tl l m t t yi g p
l t mp t

Sequard syndrome with respect to crossover of motor and sensory impairment

The type of aphasia displayed indicate involvement of the posterior part of the left inferior frontal gyrus (Broca's area) Other scattered but less easily located lesions give evidence of their presence Notable was the fact that there appeared to be some improvement following the delayed treatment Recompression probably served to promote the resolution of residual bubbles and to supply some additional oxygen at the higher chamber pressure to the injured tracts The residual findings are probably the result of permanent injury to the spinal cord and brain Although the speech difficulty and incoordination were more disconcerting to the patient than disturbance in sensation these complaints did not appear to be serious in nature

REFERENCES

1 B A R l s j s l k M M / M / 11 _ ™ 1 S t 1
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Spinal Cord Injury Following a Scuba Dive to a Depth of 350 Feet

LIEUTENANT RALPH W RICHTER MC USNR
CAPTAIN ALBERT P BEHNKE MC USN (RET)

THROUGHOUT the United States, adolescents and adults are engaging in diving activities utilizing self contained underwater breathing apparatus (Scuba) This type of equipment is reasonably safe at shallow depths in the hands of trained persons There are, however, reckless youths who seek to establish new diving records without adequate supervision or additional equipment to provide a reserve air supply What is most deplorable is the absence of compression chamber facilities in the immediate area for the treatment of accidents The following case description is representative of the critical type of injury that may be expected to occur in Scuba diving to unwarranted depths as a result of lax supervision and the absence of area facilities for handling accidents

CASE REPORT

A 2 year-old civilian had on several occasions with Scuba attained depths of 260 to 300 feet without mishap in Monterey Bay California On 31 January 19 9 in the attempt to set a new record he descended rapidly by means of a 40-pound weight supported by the right arm to a depth of 350 feet as indicated by a marker on the descending line At this depth he experienced blurring of vision constriction of peripheral vision numbness and loss of consciousness When he regained partial consciousness he estimated that he was about 50 feet below the bottom of the small tandby boat After he was pulled aboard it was observed that he was extremely apprehensive The total time for this dive was reported as about ½ minute The diver was able to stand but within 2 or 3 minutes he complained of squeezing pain in the anterior part of the chest sharp pain in the posterior neck area and a humming tingling pain throughout the right arm After his suit was removed he attempted to take a few steps but his legs became numb and he developed severe paraparesis of the lower extremities

A Coast Guard craft took the patient aboard An Army helicopter then transported him to the Naval Dispensary Monterey Here the medical officer observed that the patient right arm was mottled painful and immobile and his general condition critical The patient was further transported to the U S Naval Shipyard Hunters Point where a landing was made near a diving barge equipped with a recompression chamber ready for operation

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From U S Naval Hospital Oakland Calif and U S Naval Radiological Defense Laboratory San Francisco Calif

tl vi ite l th U S Naval Ra li l gi al D f I b t y eeking je mis i n t e-e g g in di i g activiti Ill int al l l t y indicate l a cel ated rec ery f n th ea lier ign a d n j t ms f exten i e pinal co d injury H we e the patient c mplained f the f ll ing pe ti t ymptom difficulty in walki g in the da k witho t the h lp f objects to guide hi n mi es f th f et ith ome id ce of l pai ed proj riocej ti e sation wh alki g an l i pai t f tempe tu ati n f the right l l in ludi th l e t ity with pare thesia and hype esthe ia i the i pe th aci xill a Th fact that th wa o impairme t in bladd b w l g it l f ineti n i notew rthy A phy ic l amin tion confirn ed th abc e tatem nt The appea ance of th pati nt w good d hi igl t (60 6 kg) wa ly C kg le tha his n l weight He walked ided a able t limi tairs, but g it stan e w id ed nd the w l gree f pa ticity l t te di s He w not able t e gage i u ni g x i It mb g ign wa po iti and th e wa l u f bc th anki A hill te l n a d j tell fle es we h peract Table m i tion fu th re led that lti gh mu cul f cti n of uppe a d l w r tre iti w lequat f l t il t lie l t tl r limit ti f bility t lift th l ft l g m than 0 du to a tighte l g ip f m scle Th e lso i p ired oo linati f both leg wh th heel f the foot wa m d l tally l g the cre t of th tibia T mpe atu e d p l sati n o the left l l impai ed li tal to th t nth th racic e t bra l the impai ent xt ded al g th l e tremity t the foot. F ti lly ign d ymj t m n v g tly dimi i h l w e n th l ss markably *a m tic of th initi l co ditl f ll l g inj y*

A th pom t i ne e nt w m de f us gi th e h con ted l l q nd tly i t eq i al t w ight ty method l t oduced by B l k Cutte t g a d B l ky f r the pu pose f esti ati g the r lative si of v i pa t f the body Th h dim l n c n b tran lated i to a body liu (R) l y pplicati f c t t l i ed from g up l tio hip F th ra lll so comp ted body w ight may be c lcu lated f m lt l h h l tature I th a f thl pati nt th f ll wi g equi l t body w ights (kg) l ul ted fr m the su ed t k a l ll b circumfere es w c p ed with ctual body w ight (60 6 kg) ec ded o a platf rn tle h l l (61 9) chest (61) biceps (63) f m (60 9) ai t (61 0) l ttock (9 C) thigh (9) k (C) calf (61 0) a kl (61 1) d wrist (7) Th fi ll gs w e thos e l t t v th the buill f lea muscul y g n n whose a l u lod m i em t i lic ted ly perfect sym try h n par l with tand l ba l upo a age group alues O ly the thigh girth educed (ignifi t at th l perce t l el) n l thl may ha e i di ted so legr f t ph

Fi lly in r g l t th m tt f re- gi g l SCUBA di i g the patie t l l ed t wait u til he abl t l l lge l ru i g e else

PERTINENT REFERENCES TO NEUROLOGIC INJURY

A iew of the neurologic complications of decompression sickne s re e l it there has been a remarkable lack of cerebral involvement ven un l r litions of widespread emboli m Vertigo deafne s i ual h tural nvul ions and phy ic chan e have been re l t l but perm n t les n of the l rum are rare The mo t serious

and most frequent neurologic complication involves spinal cord function. In 1900, Heller, Mager and von Schrotter [2] listed 26 men who within 30 minutes after rapid decompression developed spastic paralysis and sensory disturbances in the lower extremities, along with bladder and bowel impairment. In several cases, impairment of either one or both arms was also noted.

Thorne [3] examined 300 patients with caisson disease at the Queens midtown tunnel project. He found 5 persons with hemiplegia and 2 with monoplegia. The 14 patients who developed rectal and urinary incontinence included 5 with numbness of both legs, 2 with paralysis of both legs, 4 with severe weakness of both legs, and 3 with both motor and sensory disturbances in the lower extremities. Paton and Walder described several cases of paralysis in caisson workers. Johnson [5] reported that a sponge diver developed paraplegia and sensory disturbance at the level of the tenth thoracic vertebra with concomitant bladder and bowel impairment. Recompression begun some 10 hours after the accident was not beneficial. Five months later there was residual paralysis.

Taylor, Santos and Behnke recently described a case of a professional diver who, after 2 dives to 130 feet, developed spinal cord involvement and some 20 months later still had sensory impairment below the fourth thoracic vertebra on the right side and intermittent clonic spasms of the left lower extremity. In his source book on diving and submarine medicine Hoff refers to many other case reports and reviews spinal cord involvement in decompression sickness. Spinal cord lesions have been produced experimentally. Dogs rapidly decompressed from high pressures and then only partially recompressed (to a degree that prevents death from asphyxia) usually develop paralysis of the hind legs, footdrop, a spastic wide based gait and paralysis of the bladder musculature. [8]

DISCUSSION

The most common area of the spinal cord to be involved in decompression injury is the thoracic region and infrequently the upper lumbar and lower cervical regions. The thoracic spinal cord is supplied by small spinal branches of the intercostal and lumbar arteries (aortic circulation) and by anastomotic twigs from vessels supplying the cervical and lumbar enlargement. The anterior spinal artery trunk is made up of anastomosing ascending and descending branches of the anterior radicular arteries. The diameters of these vessels as shown in table 2 are very small when compared with their size in the cervical and lumbar region. [9] Furthermore, we usually find anterior

radicular arteries only at the 9th and 10th thoracic segments thus leaving the area in between particularly vulnerable to compromise by the presence of air emboli Behnke has stated that the preponderance of evidence points to intravascular bubble as the chief cause of the syndrome of decompression sickness In a study of frozen dried spinal cord of animals decompressed from increased pressures Cerchiari and Catchpole found bubbles only in vessels of the spinal cord Haymaker and Johnston have suggested that some of the nitrogen bubbles from the retroperitoneal fat depots may enter the spinovertebral plexus of veins and block venous return from the cord The stasis so produced may also precipitate embolization of the spinal *precapillaries and arterioles In pathologic specimens reviewed by* Lichtenstein and Zeitlin among others it has been observed that the lesions predominate in the central portions of the white matter with *the lateral and posterior columns affected most frequently*

Table *Number and location of the perforating arteries of the spinal cord (From Scheinberg and Alexander)*

Region of cord	Number of significant radicular arteries	Diameter of significant radicular artery (microns)	Diameter of anterior spinal artery (microns)
Upper cervical	1	50	90
Lower cervical		58	20
Upper thoracic	2	34	30
Middle thoracic	1	340	340
Lower thoracic	1	510	578
Lumbar	1	872	1127

In our experience the duration of the dive was too short for appreciable quantities of gas to dissolve in the tissues of the spinal cord it is probable that intravascular bubbles produced embolization and damaged the white matter particularly in the mid thoracic region Clinically involvement was greater on the left side but evidence of pyramidal tract dorsal column and lateral spinothalamic tract involvement was present bilaterally

SUMMARY

1 A case is reported of a skin diver who developed severe spinal cord involvement after ascending too rapidly from a depth of 200 feet He was placed in a recompression chamber some 9 hours after his accident and remained there for 48 hours

2 Following recompression gradual improvement in strength and

sensation of upper extremities was noted, but considerable residual weakness spasticity and sensory loss remained in the lower extremities 1 month after the accident

3 Three months following the injury the patient was able to walk unaided There were no genitourinary disturbances Residual proprioceptive and cutaneous sensory disturbances, however, were present

4 The recompression treatment in this case was directed specifically at maintaining pressure over a long enough period of time so that residual bubbles could be compressed and resorbed and at the same time oxygen supplied at increased partial pressure to the damaged tissue of the spinal cord

5 Emphasis is placed on the value of physiotherapy systematically directed to overcome, by passive and active muscular exercise limitation of joint movements

6 A new method of evaluating the relative size of different muscle groups of the body to detect atrophy has been applied in the final examination of the patient

7 The general recovery from the serious spinal cord injury was remarkable

ACKNOWLEDGMENT The diving emergency brought into immediate action units from the U S Coast Guard and Army The prompt helicopter transport from the 53d Army Aviation Company Fort Ord to the scene of the accident in Monterey Bay and the subsequent flights to the Naval Dispensary Post Graduate School Monterey and then to San Francisco were accomplished with unusual dispatch and skill Prevention of further expansion of bubble emboli required low flying in a congested area If there had been any undue delay it is likely that the diver would have been permanently paralyzed The fact that he is now walking and able to engage in normal activities is due therefore in large measure to the prompt and well executed logistic services performed by Lieutenant J D Horne and Chief Warrant Officer Leland Cole U S Army who piloted the helicopter

To the Navy men of the diving barge we are an expression appreciation for the faultless operation of recompression facilities

In any operation however there is always the unto ward event which may prove disastrous In this case the rolling and pitching of the diving barge caused by strong winds later could have severed power and mooring lines with subsequent fatalities It is our pleasure to acknowledge the vigilance and continuous attainment of special safety measures by civilian workers of the San Francisco Naval Shipyard

In the decompression chamber Lieutenant George Buxton MC USN spent many hours caring for a difficult medical casualty

REFERENCES

1 Behnke A R Clattenburg O F and Brody S Quantification of body fat by roentgenographic anthropometric measurement (Unpublished data)

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Osteochondrosis of the Capitulum Humeri (Panner's Disease)

MAJOR GEORGE E. OMER, JR., MC, USA
CAPTAIN CLYDE W. CONGER, MC, USA

OSTEOCHONDROSIS of the capitulum humeri was first recorded by Panner[1] in 1927. Laurent and Lindstrom[2] reviewed the world literature up to 1955 to collect a total of 21 cases[3-7] and added 2 more of their own. This avascular necrosis is infrequently reported and yet is common enough to merit documentation for easy recognition.

CASE REPORT

A 7-year-old Negro boy was first seen in the emergency room of this hospital on 7 October 1956 with a complaint of pain and swelling in his right elbow. History revealed he had accidentally bumped his elbow while bathing on 5 October. Physical examination revealed only tenderness over the lateral humeral epicondyle and 10° limitation of elbow extension. Roentgenograms were interpreted as normal (fig. 1). Treatment consisted of an arm sling for 3 days and the patient was advised to refrain from strenuous arm activities such as pitching baseball. He continued to be normally active and the elbow pain gradually subsided over a 3-week period.

A vascular necrosis of the capitulum was suspected on review of the roentgenograms and the patient was recalled to the orthopedic outpatient clinic in January 1957. Comparison films (fig. 2) demonstrated increased roughening, sclerosis and fragmentation of the right capitulum. The patient was free of subjective symptoms referable to his right elbow and had a normal range of motion.

In March 1957 the patient complained of mild pain in the right elbow but there was no restriction of mobility. An arm sling was again used for a few days. Roentgenograms in March (fig. 3) and June 1957 (fig. 4) showed progressive involvement of the disease and further destruction of the capitulum.

No further films were obtained until March 1958 and for the first time capitular regeneration was noted (fig. 5). The last roentgenograms were taken in October 1958, 1 year from the onset of the illness, and demonstrated excellent healing of the capitulum of the right humerus (fig. 6).

From the Army Hospital, Fort Riley, Kan. Major Omer is now at 121st Evacuation Hospital (SMBI), APO 40, San Francisco, Calif.

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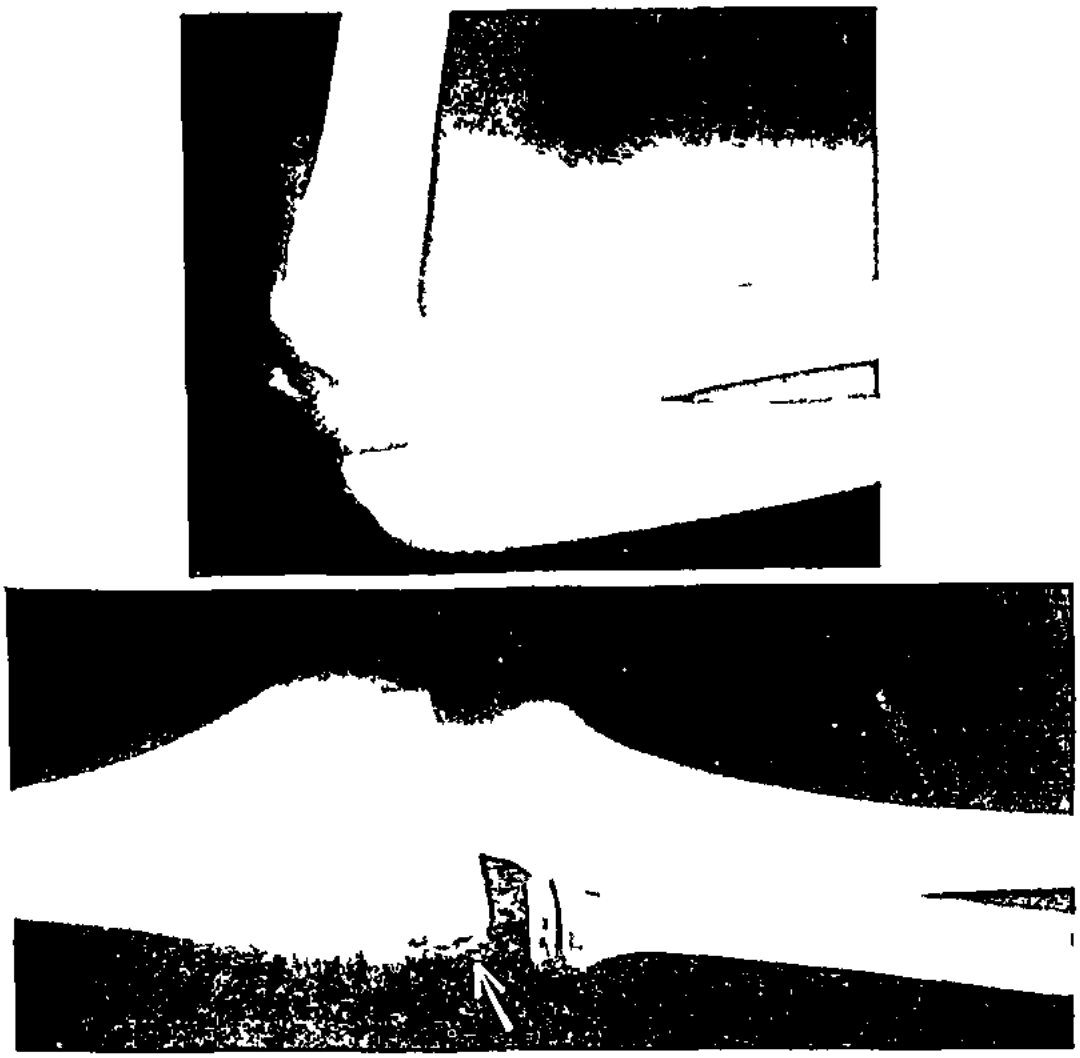
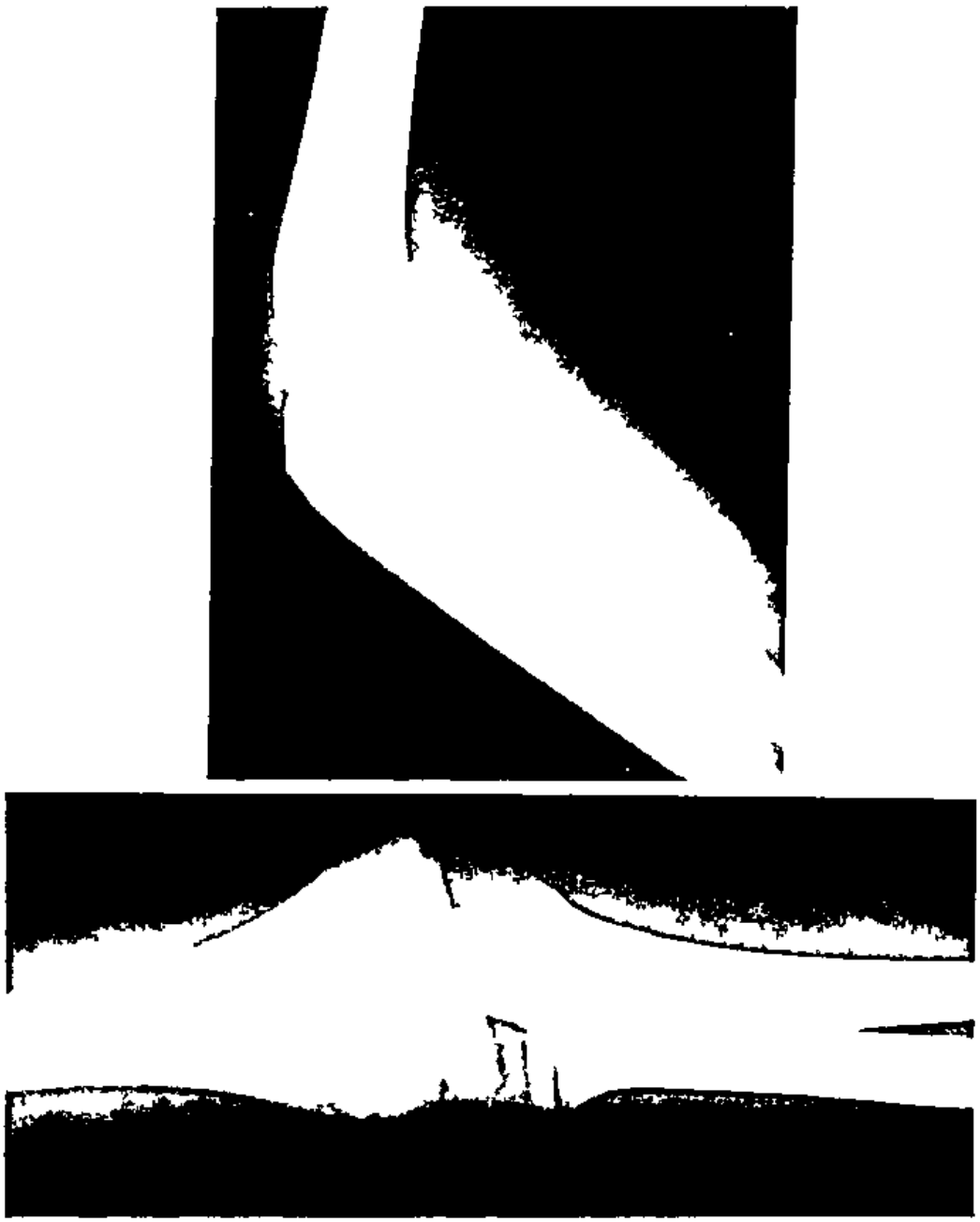


Figure 2 One month after onset of symptoms there egula ity of the capitula cortex and min mal flatten ng of the bony ma on the lateral ew

DISCUSSION

Osteochondrosis of the capitulum humeri occurs in children 4 to 10 years of age The average age of onset for reported cases is 8 years and it occurs almost exclusively in boys Only 2 cases have been diagnosed in female patients A case has been reported in which both capitula were simultaneously involved and another where similar aseptic changes were taking place in the femoral head and the patella

The cau e is unknown Sundry indictments include trauma, in fection altered blood supply to the epiphysis, and disturbance of in nervation Growth deceleration and endocrine dysfunction as con stitutional conditions affecting bony development have been considered



Figu 3 Roentg n gr m in M h 19 d m n t t i re sed f gm nt ti n nd l of n n l ntou

The n fr quency vith which thi di e e is xp cted would u_gest that it r w h rder It p rol ll y oc urs v th _re ter fr quency but the r r t mildne s c complete ab ence of clinic l ymptoms p rmit the i t p hy_n r There u ually clinical hi tory f i_l t n f ll ved l y p m nd re tricted elbow mo bility ccomp me l by n min l edema nd tenderness to p lpation

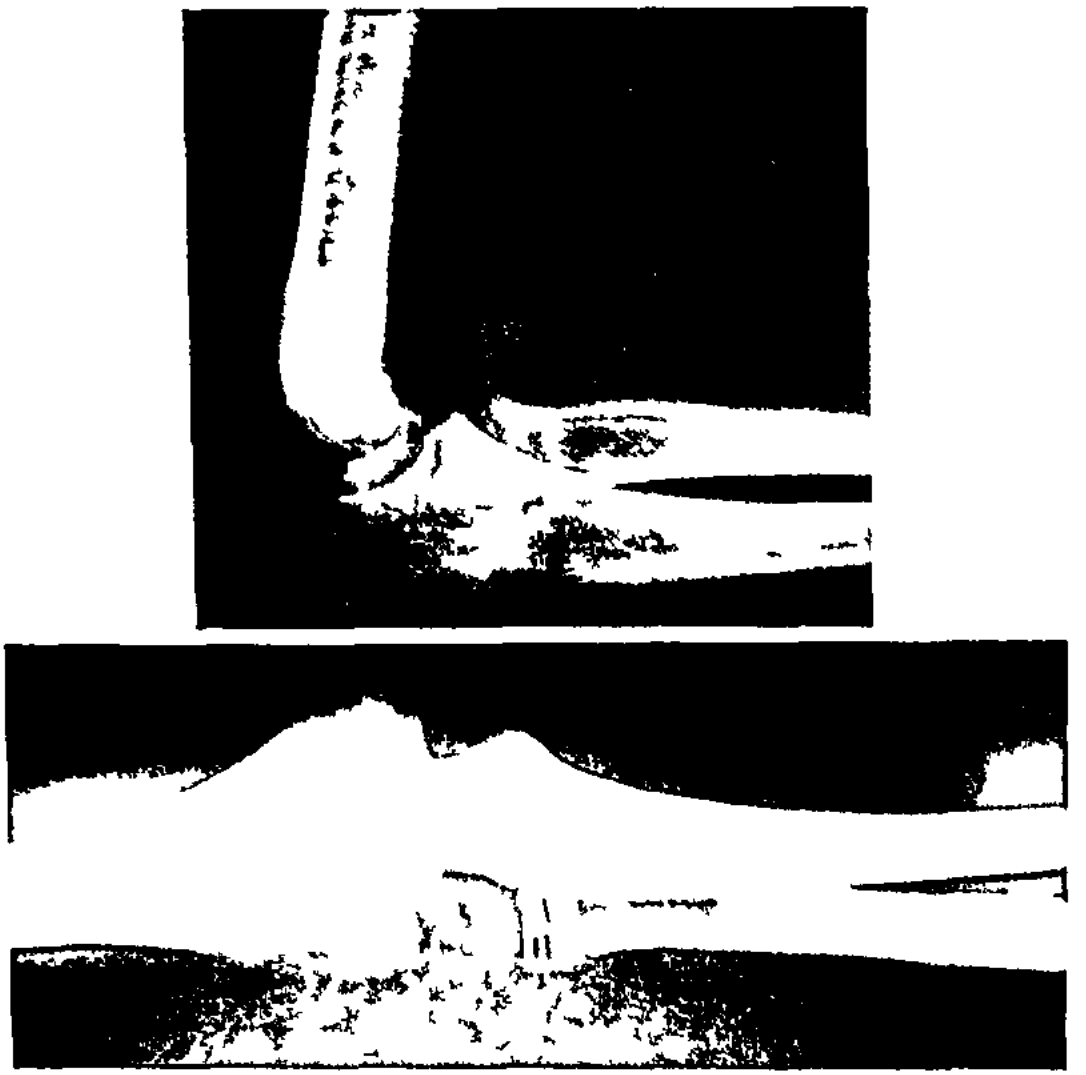


Figure 4 Eight months after onset of symptoms the capitulum is almost flat on lateral view and is completely fragmented.

Extreme flexion and extension of the forearm are restricted, and forced elbow motion produces discomfort.

The roentgenograms are diagnostic. There is irregularity of the contour of the capitular epiphysis and a thinning of the cortex and subcortical zones of rarefaction. Irregular zones of bony condensation occur within the epiphysis. There may be interruptions in continuity of the cortex. In severe cases the epiphysis undergoes flattening and complete fragmentation. This may make the epiphysis appear smaller than normal and the joint space between the epiphysis and the head of the radius appear wider than normal. There is a generalized fuzzy and ragged appearance of the chondro-epiphyseal structures of the elbow. As healing progresses the epiphysis gradually resumes its normal shape and contour. Comparison films of the

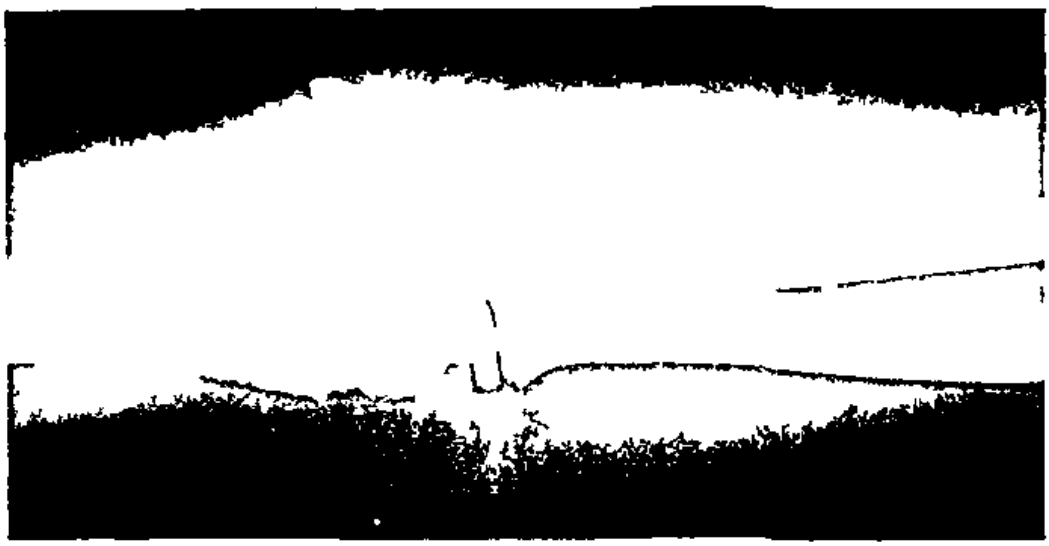


Fig 5 Roentgenogram March 1958 The patient complained of pain at the lateral aspect of the elbow for about 1 month Note the irregularity of the capitellum

normal elbow are helpful where there is evidence of old or recent injury or disease

Treatment is nonspecific and even immobilization of the elbow seems to be of little benefit An armsling during the acute stage is justified but it can be removed as soon as the pain subside The child and his parents should be instructed that the patient should not strain or overexercise the arm in gymnastics or athletics All subjective symptoms usually subside in a few weeks The benign course of the disease leads to epiphysial regeneration in the course of 1 to 3 years with insignificant or mild deformity as a final result

REFERENCES

1 Panner H J Affection of epiphysis humeri and bilateral Coxa Plana Acta radiol 1 8 611–619 1927 Cited by Ziegler 3

Laurent J P Un cas de maladie de Panner Bull et mém Soc méd des hôp de Paris 3 S 47 1110 1930

3 Elwall J F Epiphysitis of the capitellum humeri J Am Med Ass 111 0509 Feb 1938

4 Herman I Osteochondritis of the capitellum humeri Acta radiol 8 1934

Lagergren J (Osl) Osteochondritis of the capitellum humeri Nord med 108 3013 1943

6 Murch H C Osteochondritis of epitrochlea (Panner's disease) Am J Roentgenol 1 683 684 June 1944

Panner H J Osteochondritis of the capitellum humeri Panner's disease Acta radiol 10 334 1929

S Goff C W O teochondro e with emphasis on the Legg Calv Perthes syndrome In Raney R B (editor) *Instructional Course Lectures Volume VIII* American Academy of Orthopaedic Surgeons J W Edwards Ann Arbor Mich 1951 pp 41–44

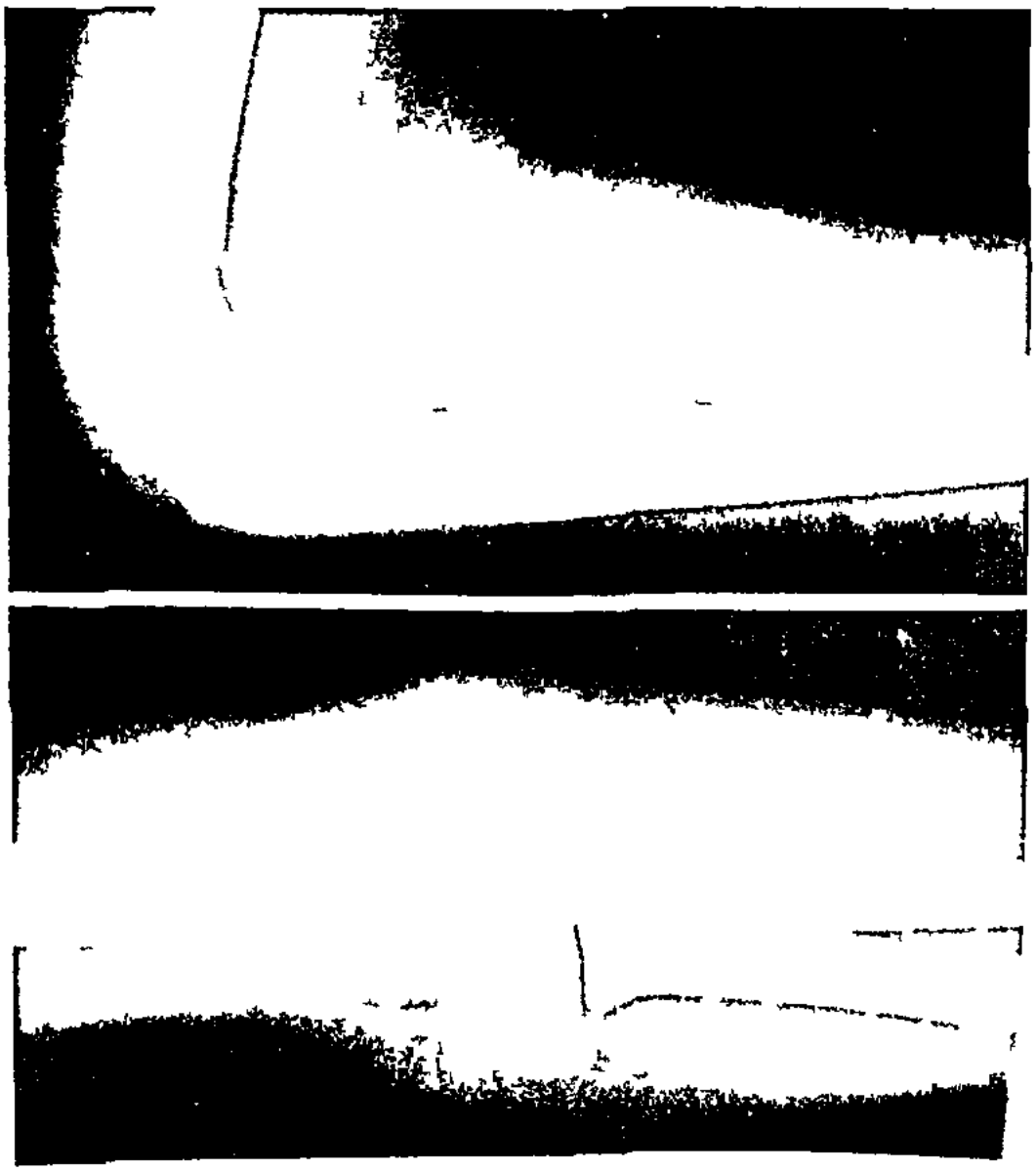


Figure 6 Twenty four months after onset of symptoms the epiphysis is completely healed with no deformity and range

Acute Intermittent Porphyria Treated With *Trifluoperazine*

CAPTAIN DAVID F. HILL, U.S.A.M.C.
CAPTAIN GEORGE J. HUCKS, U.S.A.M.C.

ACUTE INTERMITTENT PORPHYRIA is a fundamental disturbance of porphyrin metabolism in which abnormal amounts and kinds of porphyrin are excreted in the urine and feces. Porphyria must be distinguished from porphyrinuria in which increased amounts of normal porphyrins are found in the urine in such conditions as hepatitis, cirrhosis, heavy metal poisoning, alcoholism, sprue, pernicious anemia and aplastic anemia.

The earlier grouping of porphyria into congenital, acute and chronic forms has been superseded by a more basic classification:

1. Porphyria erythropoietica, in which abnormal porphyrins are formed in the developing normoblasts of bone marrow.

Porphyria hepatica, in which abnormal porphyrins and their precursors are synthesized in the liver:

a. Intermittent acute type, with manifestations in abdomen or nervous system or both.

b. Cutanea tarda type, with photosensitivity and hepatic dysfunction.

Mixed type.

Acute intermittent porphyria, the most common form of porphyria, is inherited as a mendelian dominant. Affecting females more often than males, the disease usually becomes manifest between 20 and 40 years of age. The outstanding feature of the disorder is its intermittence. Abdominal manifestations often simulate an acute intestinal, biliary or renal condition, and it is not unusual for patients to display the scars of numerous exploratory laparotomies. Jaundice may occur, and liver damage may be demonstrated by laboratory tests. Nervous manifestations may be central, peripheral, autonomic or psychic, and may simulate a variety of neurologic, psychoneurotic or psychotic conditions. Patients may have a long history of nervousness ante-dating acute attacks, and many observers believe there is a

From the Surgical Service, William Beaumont General Hospital, El Paso, Texas. Dr. Hucks is now at Walter Reed General Hospital, Washington, D. C.

nervous background for this disease Transient hypertension, tachycardia retinal vascular spasm, and oliguria have been observed[1] Skin pigmentation develops in some patients The diagnosis of acute intermittent porphyria is often difficult, and attacks may be mistaken for acute surgical abdomen, hypertension constipation, psychoneuroses, psychoses hyperthyroidism, or Addison's disease In the presence of neurologic symptoms, the prognosis is grave, with an immediate mortality rate of 50 to 75 percent[4]

The following case of acute intermittent porphyria is reported because it is believed to be the first time trifluoperazine was used in this condition The drug was chosen because of its observed effect on hallucinations and its potency in low dosage

CASE REPORT

A 20 year-old airman was admitted to U S Air Force Hospital McConnell Air Force Base on 30 December 1958 because of low back pain which radiated down the posterior aspect of both legs Physical examination on admission revealed moderate pain of the lumbar paraspinal muscles otherwise the findings were normal

Shortly after admission the patient was given 200 mg of Luminal (phenobarbital) sodium to induce sleep and rest The following morning he developed severe cramping abdominal pain Repeated examination failed to reveal any objective signs The patient continued to complain of severe abdominal pain At one time he did not have a bowel movement for several days even when given enemas and obstruction was suspected There were significant physical findings for this however and roentgenograms failed to show any small bowel distention The patient was having abdominal and back pain daily and was becoming more withdrawn and acutely depressed He refused to eat solid food and took only a minimum of fluid by mouth

On 16 January 1959 the patient was transferred to this hospital with a diagnosis of psychotic depressive reaction On arrival he was semicomatose and very dehydrated His depression and withdrawal were believed to be a result of oversedation as well as dehydration The patient's blood pressure was 150/100 mm Hg and his pulse rate was 100 Physical examination revealed an appendectomy scar and generalized hyporeactive reflexes Fundoscopic examination revealed extremely pastic and tortuous vessels there were no hemorrhages or exudates The rest of the physical examination was within normal limits

Past history revealed that the patient had had the usual childhood illnesses He had been quite well all his life He had had two previous hospitalizations The first was in 1944 when he had acute abdominal pain associated with nausea and vomiting His appendix was removed at that time The second was in 1956 when he was hospitalized for abdominal pain with nausea and diarrhea He was discharged with a diagnosis of acute gastroenteritis He had had periodic episodes of abdominal pain concomitant with the passage of dark red urine since he was 12 years old The remainder of the past history was noncontributory The family history was negative for porphyria symptoms or mental or nervous disease

Laboratory studies revealed the urine to be amber colored and cloudy analysis was negative The urine was positive for porphobilinogen by the Watson-Schwartz test on three occasions The white blood cell count was 14 400 per cubic millimeter with an abnormal differential and the hemoglobin 16 gram per 100 ml The blood urea nitrogen was 17 mg per 100 ml The unconjugated carbon dioxide combining power was 9 mEq per liter serum chloride 140 mEq per liter serum sodium 140 mEq per liter potassium 4 mEq per liter and the alkaline phosphatase 4 units A serologic test for syphilis was negative The sedimentation rate was 4 mm per hour The sulfobromophthalein sodium test gave 5 percent retention The urinary porphobilinogen level was 0 008 mg per liter of urine per 24 hours A roentgenogram of the head was normal A roentgenogram of the liver gallbladder showed a pericholecystic adhesion at the first roentgenogram An intravenous cholecystogram and a gallbladder series failed to visualize the gallbladder on two attempts

On admission to the hospital the patient was given 3 000 ml of fluids intravenously with relief of the abdominal pain and vomiting Hourly urinary output records were maintained for the first 24 hours and showed adequate urinary output Because of the patient's inability to retain oral fluids because of vomiting and because of the severe abdominal pain an intravenous infusion was started and 440 ml of glucose in water was given intravenously during the first hospital day Oral fluids were withheld for the first 24 hours in the hospital Thereafter the patient was given a liquid diet which was increased as tolerated The patient was maintained on 10 grams of potassium chloride per day for 6 days Five days after the drug was discontinued the patient again complained of severe abdominal pain The urinary porphobilinogen was tested and found to be 4 plus The patient was discharged 5 days later without symptoms Since then he has been maintained on 4 grams of potassium chloride a day and has had only occasional attributable episodes of abdominal pain for 6 months

DISCUSSION

The treatment of porphyria has been consistently frustrating No therapy will cure the victim of this illness Patients with acute intermittent porphyria should not use alcohol or barbiturates The ability of these compounds to induce crises is corroborated by their ability to increase excretion of porphyrins

The difficulty in evaluating any therapy in this illness lies in the principal characteristic of porphyria—intermittence Many agents have been used to treat this condition all claiming some success including chelating agents such as BAL and EDTA (ethylenediamine tetraacetic acid) Other agents used include corticotropin and cortisone procaine hydrochloride Urecholine (bethanechol) chloride and hexamethonium Monaco and associates treated four patients with chlorpromazine hydrochloride and described this as the single

most effective agent introduced thus far in the control of abdominal pain and nervousness observed in acute, intermittent porphyria. Klutzko[7] described a patient successfully treated with prochlorperazine.

We were confident that trifluoperazine would be useful in treating our patient because, like chlorpromazine and prochlorperazine, this drug contains a phenothiazine nucleus and is an autonomic suppressant. The mode of action of trifluoperazine is unknown, but it may be the same as that of chlorpromazine. Watson[8] believed that chlorpromazine ameliorated certain autonomic disturbances and also interrupted the vicious cycle of pain which caused nervousness, thus permitting a spontaneous remission.

Many observers[9] believe that by replacing chloride with a fluoride on the phenothiazine drug, a more potent tranquilizing drug is produced. We believe that our patient's good response was to the drug and not to a spontaneous remission of the illness. The patient's condition was becoming worse when the drug was started, and 72 hours later he was symptom free. The drug was withdrawn after 2 weeks, and the patient again developed acute, abdominal pain which was arrested 24 hours after the drug was resumed.

SUMMARY AND CONCLUSIONS

A patient with established acute intermittent porphyria was treated effectively with trifluoperazine. From 10 to 20 mg was administered orally each day. Some patients may require continuing therapy on a maintenance basis. Many of the salient features of the disease are presented. We believe that trifluoperazine is a valuable addition to the drugs known to be effective in arresting the symptoms of acute intermittent porphyria. It may prove to be the drug of choice in control of this disease.

ACKNOWLEDGMENT: Stelazine (trifluoperazine) was furnished by the Smith Kline & French Laboratories, Philadelphia, Pa.

REFERENCES

1. Watson, C. J.: Porphyrin metabolism. In Duncan, C. G.: *Diseases of Metabolism*, 4th edition, W. B. Saunders Co., Philadelphia, Pa., 1959, pp. 697–703.
Peterson, K., Jr.: In Harrison, T. R., and others (editors): *Principles of Internal Medicine*, Blakiston Co., Inc., New York, N.Y., 1954, pp. 1659–1660.
3. Martin, W. J., and Heck, F. J.: Porphyrin and porphyria; review of 81 cases, *J. Med.* 40: 239–270, Feb. 1959.
4. Kehoe, F. J., Rukey, H., and Reynolds, W. W.: Acute intermittent porphyria; clinical study, *Am. J. Med.* 4: 131–140, July 1948.

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CARDIOVASCULAR TECHNICS USED FOR FLYING PERSONNEL

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B ll t rd graphy—JOH E SMITH MD Fed al A i tio Ag cy
V t d og ply—L F c F l \ B, MD US Air F e S h l of A i tion Medicl
T l m try—C ptai \o MAN L. BAR MC USN B re f Medici d Su g ry

CARDIOVASCULAR DISORDERS IN AIRCREW PERSONNEL

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Th P bl m of El t d Blood P u Hyp t n tl P l t—LAV RENC I I MD US Ai F c School f A i ti Medicine
Prog n Ca d ul F nd g B d n L f In a St t t s—H R Y E U G RL t ER, MD \ rth Ame i Rea a ce C mpa y
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CARDIOVASCULAR DISEASES IN THE FLYER—PANEL DISCUSSION

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ELECTROCARDIOGRAPHIC STUDIES OF FLYING PERSONNEL—U S AIR FORCE SURVEY OF 72 000 ELECTROCARDIOGRAMS

Col H b t W Co USAF MC, Offi f tl A F Su g on G l p es d g

\ m l V l nd I d n of P th l gy—I EITI H \ ILL, MD l i ity f Mi hi Med l C t
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G Earl Wright M D Presi lent Aviation Medical Director s Association presiding

Supraventricular Rhythm —Edith H Wheel M D University of Michigan Medical Center

Ventricular Rhythm —Captain Roland C Hiss USAF MC U S Air Force School of Aviation Medicine

Atrioventricular Block—Major Robert L Johnson USAF MC U S Air Force School of Aviation Medicine

Colonel Archie A Hoffman USAF MC, Commander USAF Hospital Andrews Air Force Base presiding

The Wolff Parkinson White Syndrome—Edith H Wheel M D University of Michigan Medical School

Complete Right Bundle Branch Block—Major Robert L Johnson USAF MC U S Air Force School of Aviation Medicine

Complete Left Bundle Branch Block—Lawrence F Lamb M D U S Air Force School of Aviation Medicine

Ludwig G Lederer M D President Aerospace Medical Association presiding

Twave Variation —Captain Roland C Hiss USAF MC U S Air Force School of Aviation Medicine

Myocardial Infarction—Major George B Smith Jr USAF MC U S Air Force School of Aviation Medicine

ELECTROCARDIOGRAPHIC INTERPRETATION IN STRESS TOLERANCE TEST

E Grey Dimond M D University of Kansas Medical Center presiding

Discussant Captain Ashton Crabiel MC USN and George W Manning M D

LIMITS OF CARDIOVASCULAR NORMALITY FOR FLYING—PANEL DISCUSSION

Lieutenant Colonel Frederick S Spiegel USAF MC Office of the Air Force Surgeon General presiding

Participants Captain Ashton Crabiel, MC USN Lawrence E Lamb M D Ludwig G Lederer M D George W Manning M D Francis A Matheson M D John F Smith M D and Jan H Tillisch M D

Concluding Remarks—Major General Otis O Benson Jr. USAF MC Commandant U S Air Force School of Aviation Medicine



ARMY VETERINARIANS Th l gest g oup of et ina ian to ent th A my i p ceti the e f ty ffi er ecently mpl t d a milita rie tatio ur e at th A my M li al Se ice S h l C l el D iel S Ste e n dl ect nd Li ut nant Col n l M lf d C Lockwood istant di ector of th depa tment of te f y cl e at the h l a i th fi st w i s mm sho t

Officers Certified by Specialty Boards

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EXCURSIONS TO GREENLAND

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Progress Notes

Major Wayne R. Otto, MC USA and Captain Carl E Wilbur MC USN have been a igned to the staff of the civil air urgeon of the Federal Avi ation Agency Wa hington D C., and chief of the rules and procedures branch and of the accident tudie branch re pe tively in the medical standards divi ion Captain Glenn W Berry DC USN recently retired after 31 year of ervice His last a ignment was a di trict dental of ficer Fifth Naval Di trict Norfolk Virginia Lieutenant Colonel Al bert B Hunt MSC USA has been named comptroller of Walter Reed Army Medi al Center u ceeding Lieu tenant C lonel M nle G Morri on MSC USA who ha been tran f rred t the Army War C llege Carli le Barrack Penn vivania C lonel Hunt wa chief of the comptroller subject branch Army Medical Serv ice S ho l Fort Sam Hou t n Texa

Thailand "Mo t Exhalted Order of the White Elephant fifth cla " has been awarded to Mr Paul F Au tin An Army reserve nurse and wife of a Joint United States Mili tary Advi ry Group m mber h wa cited for nursing Thailand premier Field Marshal Sarit to a ucce ful recovery foll wing a eri us pera tion Captain Osca Schne der MC USN execut e ecret ry f the coo linating co mittee of medi al sci ences Office f the A i tant S cre tary f Defen e (Resear h and Engi neering) ha been a ign d a memb r of the Na y Phy ical D t lity Revi w P ri l W h ington D C

Major Cordelia Myers AMSC USA ucceeded Li ut nant Col nel Myra L. McDan el AMSC USA, as hief of the upati nal th rapi section and a i tant hief Army Me I Spe ialt C rp fficer f the Army Su g n g neral n 1 Oct ber

Captain Cl ud M Fraleigh DC USN a Japanese pri oner f war f th ee year during World War II wh received the Silver Star Medal for gallantry in action on Bataan Penin ula retired recently after 20 y ars of service in the rank of rear admiral to join th taff of the dental ho l at the University of West Vir ginia Colonel Robert J Benford USAF MC dit r of the Armed Force Medical Publicati n A n r and editor of the *Armed Force M di al Journal* atte ded the General A embly of the World Medi al A ociation in M ntreal, Canada 7-14 September a Department of Def n e repre entative Comman der W l liam G Kreeh MC USN U S Naval H pital N wport Rh I l nd has been elected a a f ll in the Am r can C lle e f Surgeon

Maj r General Ob e K. Nes USAF MC urgeon g neral of the Air Force will b a featured p ak r at the ninth annual Inter ati n Air Force Medi al Conf r n e at Jo n Hay Air Base PI 29 N v mber through 2 December Maj r Irvin I Sand rs MSC USA former hief f military p r nnel at Walter R d Army Medi al C nter i to be n m d ion l n chief f th 10 ffi n t i l ommitt on the Air Force Personnel and Training Di i i n f the Am ric n g ol Mr Mc Mill Link PI D a ociat Dir ct r f hi t rical ff irs and t rn l inf rmati n f the Air F rce r earch and v l pm nt Lieutenant C l l Raymond L. Towne USAF a ci ti m n f the public ity committ e f the A ociation f Military Surg on to meeting in Washington D C N v mbe

Colonel Joseph A. Ramel [illegible] ha been appointed [illegible] Pre id nt Command [illegible] mmand [illegible] Fi t Air Force Hea quarter y t e Third Air Force

This is Your A M A

FIVE PHYSICIANS were among the more than two hundred reserve and National Guard officers of the Army Navy Air Force Marine Corps and Coast Guard and officials of government departments selected to attend a National Strategy Seminar in Washington D C on 12–25 July 1959 at the National War College Fort Lesley J Mc Nair Brigadier General Harold C Lueth MC USAF and Brigadier General Richard L Meiling MC USAFR chairmen respectively of the Committee on Disaster Medical Care and Committee on Military Medical Affairs of the Association s Council on National Defense were two of the five physicians selected to attend More than 10 000 applications to attend the seminar were screened

At this first seminar dimensions of the scope of the communist challenge to world domination through economic social political ideologic psychologic educational religious military artistic and other means were reviewed analyzed and discussed Outstanding speakers who are recognized authorities in their fields were chosen from leading universities foundations business labor and the federal government The approach to the situation was a well reasoned and unemotional evaluation of facts including possible roles of action for the country s consideration The speakers included Senator Paul H Douglas who gave the summary of the course former Secretary of State Dean G Acheson Congressmen Walter H Judd W S J Carnahan Chester E Merrow Assistant Secretary of State J Graham Parsons and others The current situation facing the United States and the free world was reviewed critically and impartially with no mention of partisan politics

The seminar was initiated by the Institute for American Strategy and the Reserve Officers Association with financial support by the Richardson Foundation and was approved by the Joint Chiefs of Staff for presentation at the National War College Brigadier General Donald Armstrong USA (Ret) was commandant of the seminar and Colonel William R Kintner USA was deputy commandant The Foreign Policy Research Institute of the University of Pennsylvania was elected to prepare the curriculum and Dr Robert Strausz Hupe of the Institute was made the director of the course Classes were held daily with several evening sessions Usually there were 1 hour lectures followed by a 20 to 30 minute question and answer period after which members of the classes went to their seminar rooms for further discussion evaluation and review of the material presented Seminars were limited to 10 persons and an associate

course director served as moderator Class were cross sections of typical American business men and leaders in professional life they included university presidents editors, television and radio station managers, physicians, attorneys, professors high school principals business executives and labor leaders A sizable library of books pamphlets, congressional documents and other reading material was supplied to each member of the seminar Extensive bibliographic and collateral reading material slides and charts were also available upon request

Protracted Conflict the title of one book used in the course might be termed the theme of the seminar At present there are about three billion people in the world of whom about a billion are identified with the West and its friends one billion or slightly less with the Sino Soviet bloc, and the remaining billion uncommitted From Karl Marx and his communist manifesto to the unsuccessful revolutionary attempts by Lenin in 190 that led to his imprisonment in Siberia there has been a relentless and determined undercurrent of action for world domination The rapid turn of events in Russia in 1917 after the overthrow of the Kerenski government and the recent developments in China after the expulsion of Chiang Kai Shek are indicative of the determination and thoroughness with which communists pursue domination through revolution and other means

Barter, peaceful infiltration economic penetration political subversion, and physical threat or violence are some of the means and methods used by communists in their quest for power Unlike the West and its allies, who think of war and peace as separate entities the communists consider war and peace as devices with which to gain their aims No phase of human life is inviolable to communist propaganda, distortion or deceit Free nations of the world must recognize that with the emergence of communism a many headed source of power has entered into human activity Traditional rules of conduct must be critically reappraised in the light of enlarged world leadership by the United States the urgent demands of newer nation states emerging almost daily in Asia and Africa the unmet human needs of freedom from want fear hunger and disease and the specter of a growing Sino Soviet bloc

The *role of world* leadership thrust upon the United States after World War II is a very complex difficult and hazardous one The challenge is so big and so complex as to require the most thoughtful planning skillful execution and critical review of all actions While the Department of State and other agencies of the government are doing much to meet the challenge each citizen also must be prepared

thi c llecti n d ind ed b e ething f e e phy icia inte ested in therapy It i a book that m y will e d f ve to c e almo t ith t int ruption in which the will p fe t b \ e l ring l i u m nt and th t n t will wa t t h ld f pe m e t t e the ref e c shelf

MAY S BRYAN M D

TF OOK OF PHYS O OGY A B IE Y by G *g* H B ll B Sc M D F R F R S G F R S E *J \ rn D d* M D D Sc F R I P S G F R I C F R S F *nd H ld Sc b rou l* M B Ph D F R C P F M R C P 4th d ti 106 pages ill t ted W lli m \ Wilki C Baiti re Md 19 9 Price $1 0

Thi bo k bec f it a v dability a d larity of p ntati n will be *welcomed b the t d nt burd ed by mo c pe di u t xt* Ore ll d t ndi g f p ces y t m a mpou l e o e eadily allabl tl n i n lly th ea H w it ap pe l to the l we that th b k t ffer e ly the nt It l k th dep th le i abl t n tu e m r *n tl e scle t fi tt t d o th p t o the t d t It f ll to ke p p-t -date* ith th l c f i f m t n t th te t that t xtl k h uld T f e- q e tly it d let t atm nt f n at i l f i p ta whe ea the th h d it tai di f c pt a l theo le n l ge a pt bl t *i tigat s i the a e i l ed E ple f the fallu a n n s* n l g lly ha a t i th t t I h t thi b k l ot to be reco me l d t th m i o ad n ed stu lent of ph y i l gy o bl hemi t y but y b fo d f l an t d t v te t in these area

CPT RONALD E MYERS MC

FUNCTION H Hus v B y by *Arth C Guyto* M D 84 page illu trated W B S u d Co Phil delphia Pa 19 9 Pri e $7 0

Th *a th r h w itt a ey of the fiel i* of physiology at the u de gradu t le l f thos t d nt h d t have a ten i backgr d in bi l m phy ics a d h stry He h b r wed many l plified di grams f hi l m xt i e *T xtbook of M d l Ph y i logy* w itt n p- p tly f med al tu l t Hi f m t h we e l quite d ffer t i h s p t l m tary book The h pt r i the latter f llow ea h other y tem atically d th n en e f h p d m eati f m n ecti n t an th Th t t w itt n a l ti l mpl tyle re l a ily l c e the *ph i l gi gr* d lequ t ly id th le el t whi h it i directe l Th e a e tw po t f t c m th t n be m t ed h w e fir t that f the pl lcal d hemi l o cept r e i plified a in th di c l f m i d ff nd d b b l ec l that al ill t ati f m *th a th d* u ed t xtbo k ha been p oduced i the te t nde e i w I l es th ll at ry te t m te inl f r me f the label o th r pr d ed d gr m Th hart n a i ti n l deep- divi g phy i l gv i f pa tu ula i t est It ill t illu t ate t th tud nt h *iti al i th e t n l v nm t i f h eo ta i i ma ali n phy i* ol gy i c ce ed Th n id that tl e auti h achi ed bi g l l p ti g mp h i r l ly l easily r d t tb ok f phy i l y di cted t u d gr l t l p f i nal tu l t It i al of *pe t ntial e a a dy f* i th lib y of the p fe ional phy i l gi t edi al p titi

PT CHARLES GELL, C SN

THE EFFECT OF PHARMACOLOGIC AGENTS ON THE NERVOUS SYSTEM Proceeding of the Association December 13 and 14 1957 New York NY Research Publications Association for Research in Nervous and Mental Disease Vol XXXVII edited by *Francis J Braceland* MD 488 pages illustrated Williams & Wilkins Co Baltimore Md 1959 Price $13 00

In this report of the proceedings of the 1957 meeting of the association there are 36 chapters by some 40 authors The scope is in some way broader and in some ways narrower than the title would imply Although it does not deal with toxic agents and anesthetics the book discusses the use of chemotherapeutic agents and biological substances which in effective dose may have no effect on nervous tissue and it even includes chapters on metabolic defects on chemical concepts of mental function and on abnormal substances in the serum associated with psychotic behavior Among the more interesting and informative chapters are those on the evaluation of drugs in animals and patients including an important one on the role of the placebo The information on the use of drugs in psychiatric disorders while valuable has been extended and partly superseded by newer information in this rapidly expanding field The chapters on chemical concepts of mental states and on abnormal substances in serum review several provocative hypotheses concerning the induction and the biochemical concomitants of psychiatric disorder The book will be valuable to those engaged in the practice of neurology and psychiatry as well as to those actively engaged in research

COL PAUL K SMITH USAFR

A SHORT PRACTICE OF SURGERY by *Hamilton Bailey* FRCS FACS FICS FRSE and *McNeill Love* MS FRCS FACS FICS with chapters by *John Charnley* FRCS *William P Cleland* MRCP and *Geoffrey Knight* FRCS 11th edition 1389 pages illustrated J B Lippincott Co Philadelphia Pa 1959 Price $18

This eleventh edition has been commendably rewritten to keep pace with the present trends in surgery However to call this a short practice of surgery is to give it a misnomer for it has grown into a tome of almost 1400 pages and 1697 illustrations and weighs 7 pounds 2 ounces complete with a ribbon bookmark The well chosen and excellent illustrations and the semi outline form of presentation make for easy reading and reference One disadvantage is the lack of a bibliography for those desiring more detailed information on a subject The footnotes on each page are replete with interesting medical history and contribute to making this an outstanding book Although the American reader will find room for argument on some recommended methods of treatment sound surgical principles are advocated throughout In my opinion this is the best textbook of general surgery on the market today warranting wider use in this country

CAPT J J HAYNES MC USN

RADIATION BIOLOGY AND CANCER A collection of papers presented at the Twelfth Annual Symposium on Fundamental Cancer Research 1958 edited by the staff at the University of Texas M D Anderson Hospital and Tumor Institute 493 pages illustrated University of Texas Press Austin Tex 1959 Price $8 50

This is a worthwhile collection of manuscripts dealing with the basic aspects of radiation biology and cancer The monograph is divided into seven sections thoroughly covering the field is well illustrated by diagrams tables and excel

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LT OI t B R. C t

F t I N R I C by *Wld d L W t g* Fd D R \ and *P th P St t S* M A R \ 3 l editio 81 pag illu t ated W B \ l C Pl ll l ɪ ɪ l P 19 9 I ri e $

Th i f tl l g t t i hl h th th ha n il e ed v p t f ɪ ti t S ɪe fi g ɪ oced re h t it ted i fa f ge l p ɪ ɪ l thod Thes i t gr ted th o gh t th t t t ɪ ll all tl i ɪ t t o il ati f ɪ t t en Th fi t ectl i i th ɪh f ɪ rof i t a ɪj t e t n l g t al l f th ɪ l t ities l h ll ge ff ed i tl caree f n g tod Th l t t e l t l fi t t ɔ ɪ ll ect ɪ ti t t t a l p tie t a l tl t th ɪ ɪ l l ti n f li m i l th aJ v The boc k t ɪ y g l ilthood t ld ag l g e f tl l tailled re f tl pat t t th ll i le at n f l sp tal r t Tl t t g l ɪ h i e p t ti h ill k tl i t k ti ul ti t th t l t n F th v l tri e- t ill ɪ l g l l kg l l ɪ i ɪ ɪl f ɪ l l l p e t l ea f h tl th l u l th pe t t ill t at F th tea l w l l l k t ll at I ed t ght pentedlly tl ɪa t th h k rs f esh l

LZ \ F \

A TEXTBOOK OF PHARMACOLOGY AND THERAPEUTICS. In Its Relation to Anesthesia. By Harold A. Wright, M.S., Ph.D., and Mildred Hastings, Ph.D. With an appendix on Canadian Drug Legislation by Charles H. Vance, B.A., Ph.D. Fifth edition, 410 pages, illustrated. W. B. Saunders Co., Philadelphia, London, Toronto, 1939. Price $4.

This book should be well received by both the nurse and the physician. The administration of drugs to patients is one of the most important functions performed by the nurse in the course of her duties in medical, surgical, pediatric, or psychiatric nursing. It is the physician who makes the diagnosis and prescribes the treatment, but upon the nurse usually rests the responsibility for the administration of the medication and the observation and recording of its effects. Like its predecessors, this seventh edition attempts to bring pharmacology and therapeutics abreast of the recent advances. The presentation is in conformity with the fifteenth edition of the *United States Pharmacopoeia* and the tenth edition of the *National Formulary*, and the official drugs are so designated. The chapter on acidosis and alkalosis has been greatly expanded with the addition of numerous extensive discussions of clinical acidosis and alkalosis and the presentation of the various intravenous electrolytes. Complete new sections on the use of tranquillizers and antipyretic *analgesic* drugs have been added to the chapter on hypnotics and sedatives. In the chapter on cardiovascular drugs the material dealing with the antihypertensive drugs has been almost completely rewritten. Because of its close relationship *to the* treatment of cardiovascular disease, and because of its importance in the chapter on diuretic drugs has been brought into the section dealing with the treatment of cardiovascular disease. Discussion of the use of the newer *diuretic agents* has been considerably expanded. New material has been added to the arithmetic review and all introductory arithmetic has been rewritten together in a single chapter. New material has been added dealing with normal and molar solutions, equivalents and milliequivalents. The section is emphasized by the use of a special format. This excellent book is recommended to nurses and physicians who desire a concise presentation of the field of pharmacology and therapeutics that is applicable to military medicine.

LT. COL. MAXWELL BAUER, MSC., USA.

THE INNERVATION OF MUSCLE. A Biopsy Study. By C. Coers, M.D., and J. Woolf, M.D. 149 pages, illustrated. Charles C. Thomas, Publisher, Springfield, Ill., U.S.A. 1939. Price $9.

One of the last achievements of the late Dr. J. G. Greenfield was the publication of an Atlas of Muscle Pathology jointly with Drs. Shy, Alvord, and Peers. In the field of neuromuscular disease this atlas covered the muscular aspect in a thorough manner. However, there was a gap left in our knowledge of nerve and muscular changes at the site of the end plate or the *actual* neuromuscular junction. This gap has now been closed by a work of highest quality. Drs. Coers and Woolf present a complete survey of the normal and pathological of intramuscular nerves and nerve endings. The *material has been* gathered by numerous biopsies. Vital staining by local injection of methylene blue, cholinesterase histochemistry, and Bielschowsky silver impregnation have been used and are described in detail by prescription. The *quality of the* illustration is excellent. The text is neither overly short nor effusive. It

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L COL I L H C L A

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COL Y UR Y M USA

H OOK D FT T ER. Y by *D th T* 3d ed t ·· pages U i ty f Chi ag I Cl l g Ill 19 9 P i $.

Th i q ti l t th t th edit f th book ha hi ed h tjecti i ı id t f d guid f diet ti ı ti It i p

tical clearly written and thought provoking Material presented in previous editions has been expanded references have been brought up to date and useful information on the fatty acid content of food has been added The section on normal nutrition has been broadened to include adolescence and old age Emphasis throughout this book is on optional nutrition Therapeutic diets are described in terms of dietetic principle rather than in terms of disease or name of physician This approach allows for greater flexibility in treatment by diet and encourages consideration of the patient as an individual The description of the daily food plan by food groups rather than individual food items as well as the inclusion of sample menu patterns and sample meals is an invaluable teaching aid This book is recommended for both the physician and the dietitian

LT COL HELEN M DAVIS AMSC

CONDUCTION INFILTRATION AND GENERAL ANESTHESIA IN DENTISTRY by the late *Merrill Ward* DDS and *Marshall J Nelson* MD FACC General anesthesia section by *Julio de Roy Bourgoyne* BS DDS 6th edition 394 pages illustrated with engravings and large trigeminal chart Dental Items of Interest Publishing Co Inc Brooklyn NY 1959 Price $8 50

This is the twentieth printing and the first posthumous edition of a book familiar to the dental profession revised once more and with a new section on general anesthesia in dentistry Part I of this text deals with the indications scope and technic of administration of local anesthesia as required in the practice of dentistry The many illustrations successfully depict the anatomy of the sensory innervation of the face and oral structure The technic of placement of anesthetic solutions and the structures anesthetized are accurately explained and illustrated in detail Three chapters at the end of this section deal with preoperative and postoperative medications untoward reactions and indicated treatment. In the last chapter the author has raised and answered a number of questions pertaining to frequently encountered complications of local anesthetic injections Part II deals with the indications contraindications types of anesthetic agents technic of administration and complications that may arise during the utilization of general anesthesia in dental office practice The presentation is conducted along practical lines The use of general anesthetics both inhalant and intravenous agents is described and the stages of anesthesia correlated with the observable salient signs This volume contains little on the physiology or pharmacology of anesthetic agents However the copious illustrations and descriptive detail qualify it as a fine reference and teaching text for the dental student

COL LOWELL E MCKELVEY DC USA

BIOLOGICAL PSYCHIATRY edited by *Jules H Masserman* MD 338 pages Grune & Stratton New York NY 1959 Price $9 50

For those who are interested this collection of papers by contributors covering the Proceedings of the Scientific Session of the Society of Biological Psychiatry is a most worthwhile current reference volume The book is divided into five parts I Neuroanatomy and Neurophysiology This section highly technical in part has its practical consideration too as it considers such topics as chemical studies correlated with neurologic behavior behavioral changes associated with stimulation of the reticular formation drugs used in the treatment of depression and neurosis II Clinical Research This part comprises clinical metabolic research in manic depressive illness the catechol amines in relation to induced electrical convulsion and the action of epinephrine breakdown

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medical student with a point of view but with valuable information relative to the prevention and progression of disease

CAPT HOWARD I SESSIONS MC USN

MOLOY'S EVALUATION OF THE PELVIS IN OBSTETRICS by *Clark W Stoer* MD Med Sc D FACS FACOG 2nd edition 111 pages illustrated W B Saunders Co Philadelphia Pa 1959 Price $4

It is nice to have this small hard bound standard reference in our dystocia clinic This new edition by Dr Stoer has improved by some new figures in the early chapters by an analysis of the *frequency of occurrence* of the various pelvic types from a series of over 1000 roentgenographic examinations and over 10000 clinical evaluations and by a tabulation of the percentage of probability of cervical arrest in the various pelvic types The section on forceps operation which was lengthy in the first edition has been deleted and a section on the relationship of head position at the pelvic types at the inlet has been added The remainder a new chapter on the recognition of disproportion As described here this recognition is a continuing process during the course of pregnancy and consists of (1) clinical examination early in pregnancy (2) observation late in pregnancy for the size of the fetus and expected engagement near term (3) reexamination clinically at the onset of labor and (4) estimation of disproportion by X ray pelvimetry This we believe puts proper emphasis on clinical evaluation and de-emphasizes roentgenographic examinations of the pregnant female the incidence of which in the author private patients has decreased from 30 percent to about 10 percent and is still about double the number performed in many clinics This fine little reference book is a necessity in any dystocia clinic or obstetric X ray conference room

CAPT DWIGHT A CALLAGA MC USN

X RAY DIAGNOSIS OF THE ALIMENTARY TRACT IN INFANTS AND CHILDREN by *Edward B Singleton* MD 332 pages illustrated Year Book Publishers Inc Chicago Ill 1958 Price $11

This is a valuable reference text for any physician doing children's fluoroscopy and radiology The information presented is current and more detailed than most pediatric radiographic textbooks The volume will serve as a ready reference for the occasional examiner of the alimentary tract in infants and children as it thoroughly reviews the anatomy physiology and pathology of the part to be examined Good illustrations of each pathologic condition as well as the normal infant gastrointestinal tract are presented All of the common and many rarer entities are discussed A particularly good review of controversial subjects such as esophageal gastric junction and congenital anomalies are handled in detail These discussions are supported by a good bibliography Types and methods of examination are discussed at the beginning of the chapters These dissertations on the performance of the examination are especially valuable to the radiologist who infrequently examines children This book makes a valuable addition to the library of the radiologist and also would be useful to pediatrician as a reference book on the gastrointestinal tract of children

JAMES M KEEGAN MD

PEDIATRIC NEUROLOGY by *Stanley S Lamm* MD 349 pages illustrated Landberger Medical Book Inc New York NY 1959 Price $11 50

The present volume will probably fill the need for a textbook of pediatric neurology for daily use at the clinical level rather than as a reference work

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Monthly Message

In the Summer 19 9 1 sue of the *Yale Review* there is an article by Bertrand de Jouvenel French political philo opher which was first delivered a one of the Storrs lectures at Yale The title is Ego in Otherdom It is realistic informative entertaining and filled with sound philosophy Ego is man (you or I) and Otherdom the world into which man enters A verisimilitude might well be the entrance of the young physician fresh from internship into one of the military services hence my reference The author states four axioms which are self evident

1 Each m c f mo g w th a h ghly o g ed field f f ces
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The application to the military is apparent its organization based on traditions its slow change the courtesie ethics and loyalties and the sense of ecurity experienced by each member So much so that even among the regular forces members of one service feel far more at home and a part of that service than they do in one of the others even though they may have close personal friends in another service To go a step further unquestionably this accounts for the great preference of members and families of one service when ill to go to one of their own hospitals They fit in better and as ume their own place more readily

Unless there is complete unification of the military not just a single medical service there would soon develop a state of com parative chaos or randomness and what we know as e prit would disintegrate To quote further The stability of Otherdom as I know it is made up of a general adherence of individual to typical behaviors the combination of which makes up the whole as I know it If all these individual were to depart simultaneously in a notable manner from their specific typical behaviors then Ego would find him elf lost and wandering in an incomprehensible and unpredictable universe

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Foreword

The *United States Armed Forces Medical Journal* is a monthly publication of professional and administrative information for medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the United States Army, Navy, and Air Force invite members of the regular and reserve medical services, the professional consultants of the military departments, and other physicians and health scientists with an interest in Department of Defense activities to submit manuscripts for publication in this *Journal*.

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MAJOR GENERAL OLIVER K. NESS
Surgeon General, United States Air Force

From Hazelhurst to Brooks
A Saga of Aeromedical Pioneering

MAJOR GENERAL OTIS O BENSON JR USAF MC

MORE THAN FOUR DECADES have passed since the School of Aviation Medicine was born at Hazelhurst Field near Mineola Long Island and American aviation has progressed from flimsy crates made of baling wire and canvas to sleek metal craft capable of fantastic speeds and heights literally out of this world

Aviation medicine also has made startling progress over the years Indeed aviation medicine has made it possible for aviation in general to advance This progress has been made possible through the talents and dedication of military physicians with vision ability and passionate determination

The need for specialists in aviation medicine became obvious early in World War I when the British discovered that out of every 100 pilot fatalities only 2 were due to enemy action and 8 to airplane failure Of the remainder 30 died through their own carelessness or recklessness The other 60 pilots were killed because they were physically unfit to fly in the first place [1]

The necessity for some kind of specialized medical care for flyers was clear by the time America entered the war

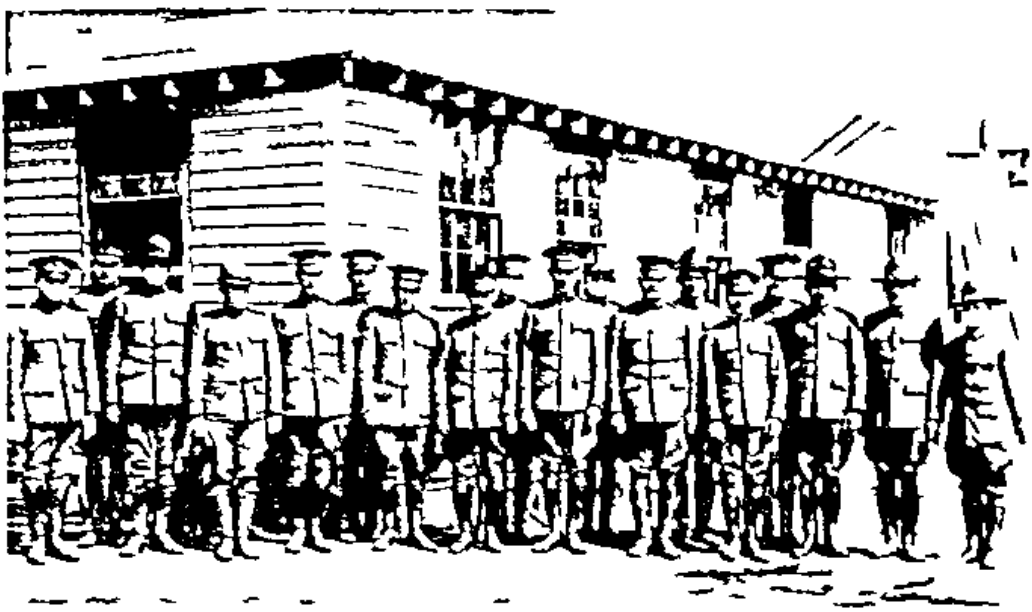
The need for pre training examinations had been recognized for some time in the United States In February 1912 the U S Army passed an order to all medical officers which stated All candidates for aviation duty shall be subjected to a rigorous physical examination to determine their fitness for such duty [2] Two years later Brigadier General (then Major) Theodore C Lyster MC USA began revising physical standards for candidate aviators An ophthalmologist he emphasized the importance of vision ocular muscle balance and the effects of refractive errors

---

From U S Air Force School of Aviation Medicine Brooks Air Force Base Texas

Shortly after America s entrance into the war the revised physical examination for aviation training applicant appeared Developed by General Lyster together with Major Isaac H Jones and Major Eugene R Lewis the new standards were arbitrary as there were as yet no precedents to guide the physicians [1]

The new criteria were quickly put to an acid test Despite careful selection of students the mortality rate from aircraft accidents among flying cadets climbed Something had to be done to improve the situation and on October 18 1917 General Lyster then chief surgeon of the Aviation Section Army Signal Corps appointed an

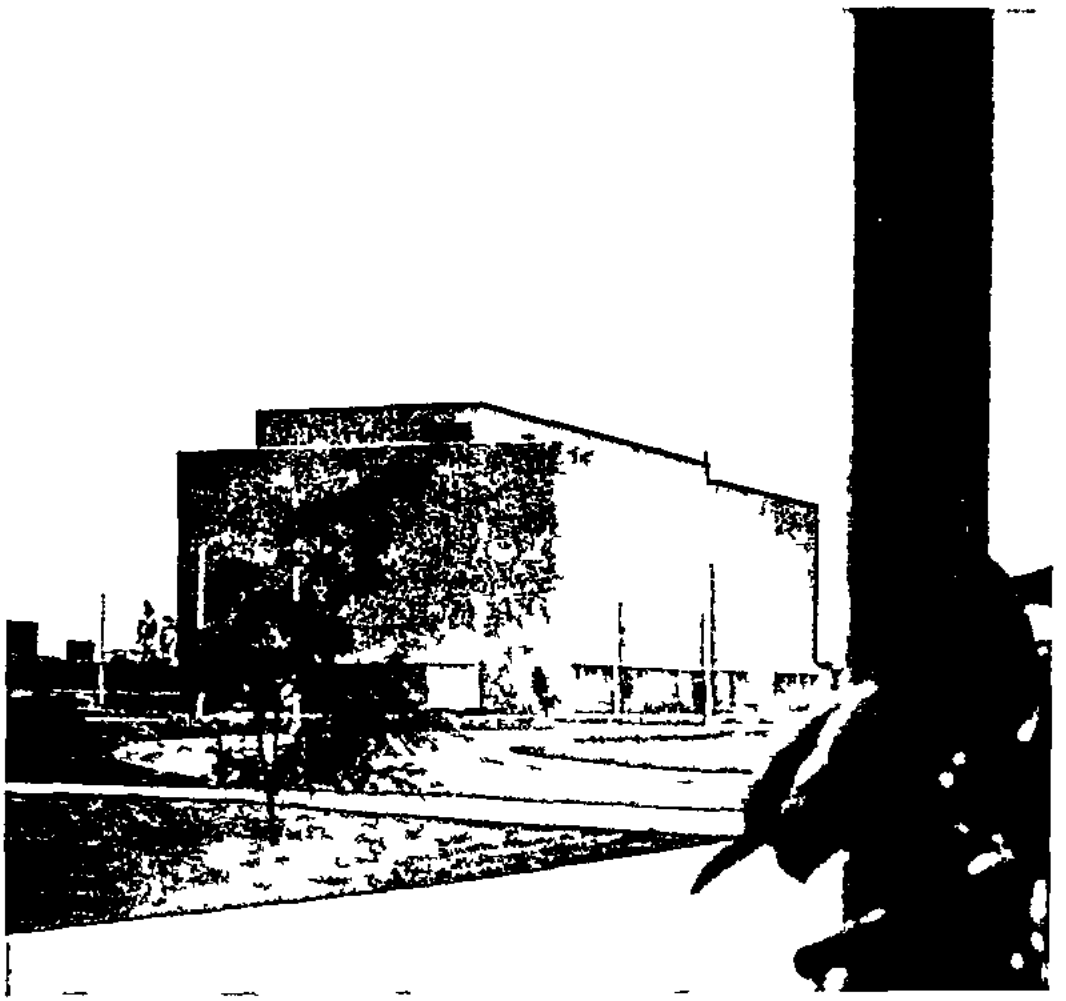


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Aviation Medical Research Board to investigate aviation medicine problems and conditions affecting the efficiency of pilots The Board wa to institute and carry out experiments to determine the ability of pilot to fly at high altitudes and to provide apparatus for the supply of oxygen to pilots flying at high altitudes

Whil con truction of a research laboratory at Hazelhurst Field wa un ler av General Lyster went to Europe for a first hand look at a iation m di as practiced by the Allies [2] In tho e days a flyer l a l t a k hi ommanding officer before he could go on ick all ar d m y pil ts cho e to ignore or conceal their illne es rather

than run the risk of being thought cowardly Those who survived the crashes—and there were many crashes—were immediately ordered to take up another plane This was to see whether they still had the courage to fly Whether they were physically or mentally fit to do so was apparently not given any great amount of thought [3]



The fou tory ea h n t t t of th new hool ho the pa e l on on and two man pace cal n m lato the lepa tm nt of et nary e e a l gl l el ol alt 60 ad at on fa l ty tl e a om d cal l brary nd off c of tl commandant and l taff

General Lyster and hi group returned from France convinced that the medical problems of pilots were not understood Experience overseas had shown him that medical officers were needed to keep a close and continuing watch on flyers and to serve as advisors to their commanding officers

Meanwhile the new Air Service Medical Research Laboratory at Mineola had been completed and was in operation commanded by Colonel William H Wilmer With a decompression chamber research on human tolerance to lowered oxygen tension was begun and training of flight surgeons was started In May 1918 this country s first 3 flight surgeons (the title had been adopted by the laboratory in 1918) were graduated and by July the new facility had tripled in size and established branch laboratories to examine and classify pilots at 20 flying training fields throughout the United States

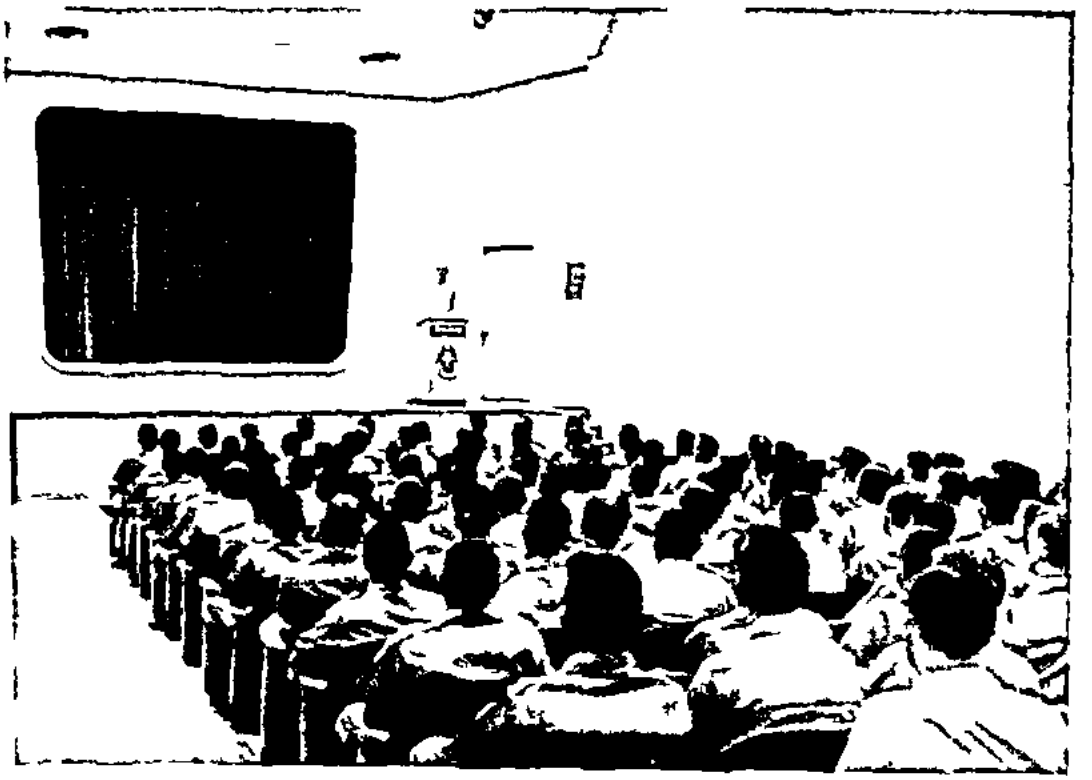
In August 1918 General John J Pershing cabled the Mineola laboratory for all the flight surgeons medical technicians and equipment it could send him The entire facility including the commandant a mobile pressure chamber and 14 tons of equipment answered the call with such dispatch that the group was established at Issoudun France by early September

Colonel Wilmer s group found no change in conditions among American flyers in France as General Lyster had noted during his visit The physical status and mental attitude of the aviators was generally poor pilots overindulged in food and drink and were not getting sufficient exercise Perhaps most discouraging for the aero medical physicians was the fact that there was still no medical check of pilots before flying and they were compelled to obtain their commanders permission before going on sick call The accident rate was alarmingly high

The flight surgeons immediately established a program of exercise rest and continual medical attention Results were soon apparent by October the accident rate had been reduced morale was improved and the pilots were more optimistic when they clambered into their planes for a hard day of flying

Major Louis H Bauer succeeded Colonel Wilmer as director of the laboratory in January 1919 The organization was now called the Medical Research Laboratory and School for Flight Surgeons The two functions were separate but were served by the same staff Assigned personnel were responsible for conducting research in their specialties and for classroom instruction duties

In March Major Bauer was informed by telephone from Washington that a class of students would shortly be en route to his facility to be turned into flight surgeons He quickly called his small staff together and after much debate devised a curriculum The course was



Student officers in the primary course in aviation medicine attend a lecture in the 433d assembly hall of the new academic building

to be 2 months long and would include ophthalmology otology physiology cardiology psychology neurophyschiatry and physics The first class to receive a regular course of instruction for flight surgeons began work in May [5]

Classes were still being graduated when the laboratory moved to Mitchel Field Long Island the following November In February 1921 the War Department recognized the School for Flight Surgeons as a special service school coming directly under the Chief of the Air Service [2] The title of the institution was changed again on November 8 1922 The new name was the School of Aviation Medicine

In the years to follow many changes came to the institution but the name and the training of flight surgeons remained constant Although the title length and content of the course have all changed from time to time through the years the training of flight surgeons itself has never been discontinued despite shortages of money staff personnel or adequate space

The course of instruction was recognized as one of great value almost from its inception as is apparent from the wide range of student personnel it attracted The Navy detailed medical officers to

the school for training until as late as 1939 when its own school was established in Pensacola Florida Foreign medical officers have been permitted to attend the School of Aviation Medicine since 1923 After the Air Force became a separate service in 1947 the Army continued to send its officers to the school and does so to this day

The years 1925 to 1934 were slender ones for aviation medicine in America The school s budget in 1926 was about 17 thousand dollars and by 1934 had dropped to 12 thousand dollars At one point the staff numbered only 6 officers 8 civilians and 4 enlisted men [7 8]

In August 1926 the school was transferred from Mitchel Field to Brooks Field to bring it close to the aviation cadet training center then in San Antonio where it was hoped more effective work could be accomplished in pre training selection and aeromedical research At Brooks the small school was lodged in a corner of the big balloon hangar remaining there until mid 1927 when a permanent structure was completed for it



Observed by n n t t in ophth lmology tu l nt off p p t use th f l t of 16-cl y l n the t n m d n m t n w g of tl n w l m l u l l ng

During the 5 years at Brooks the school occupied itself with administering physical examinations for flying personnel and training flight surgeons In 1931 the school was moved again this time to newly opened Randolph Air Force Base northeast of San Antonio [9]

The new quarters at Randolph were larger and more modern providing better accomodations for study and research In 1932 Lieutenant Colonel Albert P Clark then commandant directed that the institution s research be surveyed with the formation of an integrated program in mind Ideas for 25 separate studies were proposed a program that would have kept a large research facility busy for years



One of the 16 mod n la oom locat l n th a a l m c b ld ng The eat a e po t on d to g e ea l t d nt an nol t te l ew of the n t cto

With little equipment a tight budget and a small staff devoting almost full time to teaching the school could do little toward implementing much less completing such a program

Nevertheless by 1934 some coordinated research was under way It included psychologic testing work on aviation goggles vision in the aging pilot night vision cockpit lighting color blindness and the development of a kit for flight surgeons Lack of trained personnel funds and a pressure chamber prevented the staff from accomplishing much work in physiology

Throughout the thirties it was increasingly difficult to interest physicians in the course in aviation medicine Public apathy concerning national defense and an air corps had a direct and demoralizing effect on aviation medicine In 1935 flight surgeons were removed from flying status Sixteen had been killed in aircraft mishaps and now flight surgeons justifiably believed they were being required to accept the dangers of their chosen profession without due compensation

Four years later the war in Europe began to alarm the United States The country began to mobilize in 1940 and in April 1941 the School of Aviation Medicine expanded its program Funds were obtained to build a second structure for the school at Randolph and flight surgeons were restored to flying status

Early in 1942 the school's research program was formally established by Brigadier General Eugen G Reinartz then commandant with Major (later Major General) Harry G Armstrong as its director By the end of the war more than 500 research projects were completed including studies on color perception night vision the influence of aircraft noise and gunfire on hearing the effects of carbon monoxide in cockpits and decompression sickness

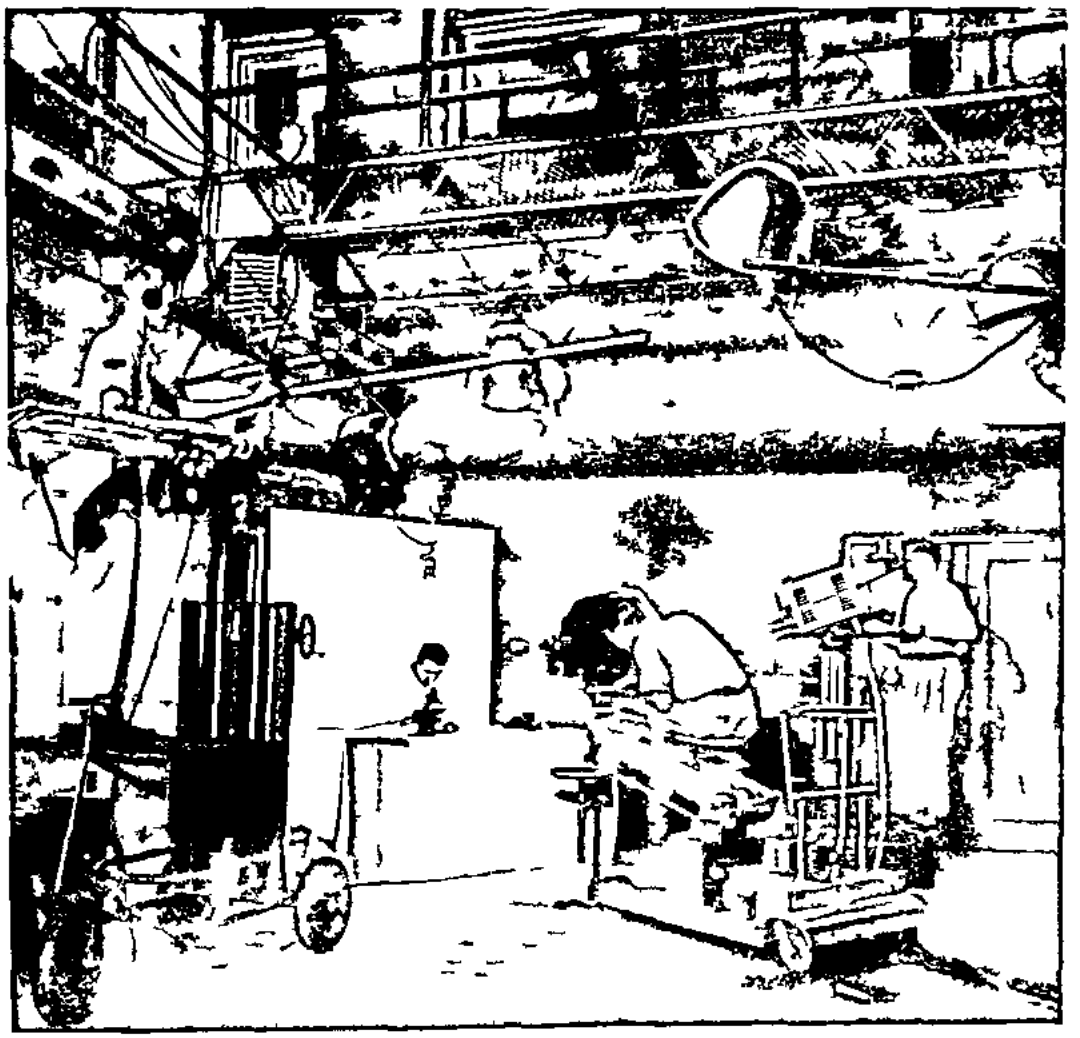
During the war the school trained flight nurses and expanded to such an extent that it was necessary to establish temporary branches around the country At the war's end the institution had graduated more than 4 200 medical officers and several thousand nurse and aeromedical technicians [10]

Because of rapid demobilization and loss of public interest the school had a brief spell of difficulty but the development of jet aircraft and the advent of rocket missiles soon posed new medical problems for the flyer and these in turn created a need for continuing research

In 1946 General Armstrong then commandant of the school and later Air Force Surgeon General presented a comprehensive report detailing the need for expanded modernized facilities for the school and voicing the need for an aeromedical center to be designed and built for the special needs of aeromedical research and education in the coming era of rocket flight It would absorb the School of Aviation Medicine and expand its facilities for the study and treatment of conditions peculiar to flyers [2, 11]

A new controversial area of aeromedical endeavor inaugurated in 1948 emphasized the need for a facility like the one proposed by

General Armstrong At a panel meeting of well known scientists called by General Armstrong to discuss aeromedical problems of space flight the school s Dr Hubertus Strughold and Dr Heinz Haber set forth their findings on problems which would be en countered in space [12] This meeting was followed in February 1949



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by the establishment in the school of the department of space medicine the first of its kind General Armstrong headed this new department briefly then placed Dr Strughold in charge

In a paper entitled Where Does Space Begin? [13] written in 1951 Doctors Strughold Haber Konrad Buettner and Fritz

Haber the 4 original members of the department described levels where spacelike conditions are found in the upper reaches of our atmosphere and discussed problems of supplying future space men with oxygen and a reasonably comfortable cabin climate They outlined the need for protecting space crews against cosmic radiation and meteors and brought up the question of weightlessness in space This was the first time that such subjects had been comprehensively discussed and the paper attracted immediate worldwide attention

While space research at the School of Aviation Medicine was getting underway General Armstrong s plans for an aeromedical center were also moving ahead By the summer of 1949 the project had progressed to the point of approval by the late Secretary of Defense James Forrestal General Armstrong was named surgeon general of the Air Force but before departing for Washington appointed an aeromedical planning board to make definitive plans for the center and guide it toward final approval

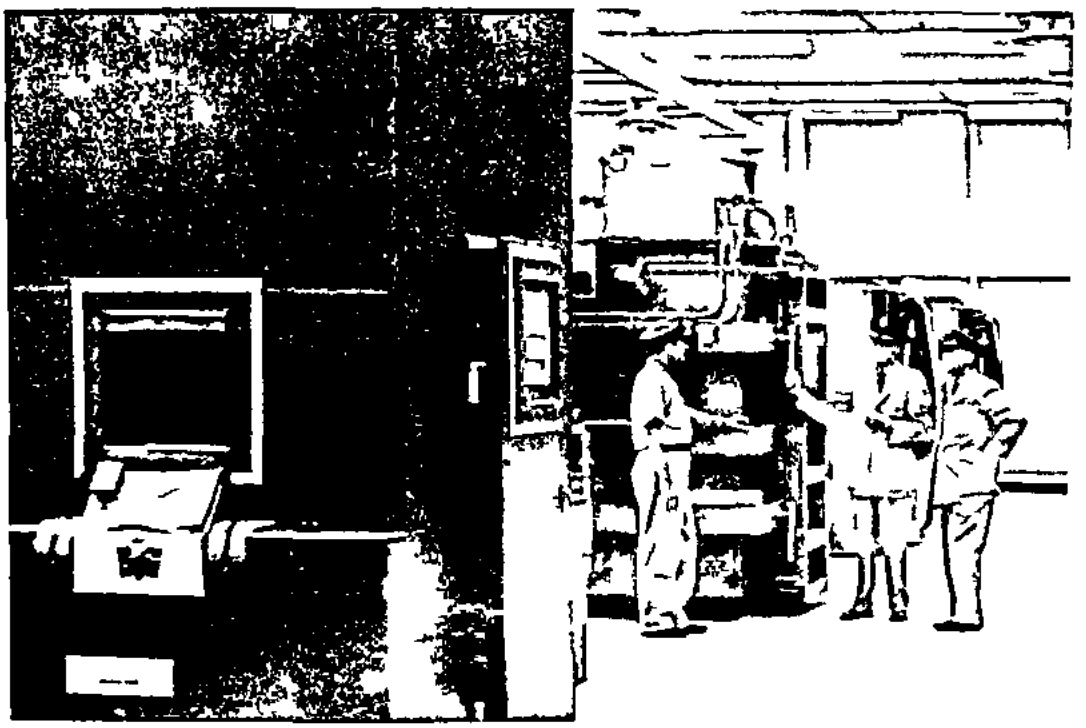
I was named to succeed General Armstrong at the School As chairman of the Aeromedical Planning Board I continued General Armstrong s drive toward realization of an aeromedical center The findings and recommendations of our group were published in 1949 as the Report of the Aeromedical Planning Board on an Aeromedical Center and were used as the basis for the original design of the new School of Aviation Medicine at Brooks Air Force Base

The need for expanded modernized and centralized facilities for the school became pronounced in early 1950 The outbreak of the Korean conflict brought an immediate increase in the aviation medicine program The school long cramped for space at Randolph (it occupied some 44 elderly buildings scattered throughout the base) could expand no further It was forced to split its operation and set up a branch at Gunter Air Force Base Alabama The flight nurse course together with those for physiologic training of officers and all courses for enlisted men were transferred to Gunter The division was not intended to be permanent Aeromedical center planners intended to reunite the two facilities when the center was realized

By 1951 detailed plans and specifications for the aeromedical center were complete calling for 5 main buildings together with housing and support services The estimated cost was 30 million dollars at 1951 price level After review by the Air Staff the plans were divided

into 3 increments and it was decided to request authority for building the first 2 increments but to ask for funds for the first package only The Bureau of the Budget deleted authorization for the second increment and slashed the funds for the first from about 10 million dollars to 8 million dollars The latter figure was authorized by Congress in July 1952

On the heels of the drastic reduction in the proposed facilities came an addition to the function of the school In October 1952 the institution assumed responsibility for the specialized practice of



Low p e e chaml e s n the alt tude labo atory tl la t b ld ng to be on pleted at B ook a e l n ndo t nat ng t d nt n the phy olog t s of fl gl t and the of ovyg n eq pm nt an l p e re u t

aviation medicine Under thi arrangement special consultation services would be offered for difficult or borderline diagnostic problems encountered by flight surgeons in the field This service quickly developed to the point where specialists from the school were examining an average of 400 referred patients each year It was recently organized into a directorate of consultation services headed by Dr Lawrence F Lamb

The American Board of Preventive Medicine received authorization from the American Medical Association in February 1953 to estab

lish aviation medicine as a distinct specialty and to grant specialty certification to physicians properly qualified in aviation medicine culminating 10 years of planning and hard work by aeromedical leaders Prominent in the campaign were General Armstrong Dr Bauer Captain Wilbur Kellum MC USN now retired Dr Jan H Tillisch of the Mayo Clinic and medical director of Northwest Airlines Dr Conrad Berens pioneer flight surgeon and distinguished ophthalmologist Dr Walter L Bierring chairman and Dr Ernest L Stebbins then secretary treasurer of the American Board of Preventive Medicine and I It was my honor to be named the first vice chairman for aviation medicine of the American Board of Preventive medicine It was the first time a branch of medical science starting as a strictly military endeavor attained formal status as a medical specialty

Another milestone was reached in May 1957 when ground was broken for the new School of Aviation Medicine at Brooks Air Force Base Among the participants was Representative Paul J Kilday of San Antonio a zealous supporter of the school in Congress since plans for the new center were first drawn up

On August 3 1959 I officially transferred the school s command post to the new facility at Brooks and at the same time opened the academic building The first class to attend the primary course in aviation medicine at the new school began work on August 11

At the new quarters the school has a total of 47 buildings with 460 000 square feet of floor area Principal activities are conducted in 5 new permanent structures on a knoll on the northwest corner of the base The first increment of the 3 planned the buildings have 280 000 square feet of floor area Concentrated on 15 acres of ground they include the research institute altitude laboratory academic building flight medicine laboratory research shops building and heating-cooling plants

Although the new establishment is an improvement over the Randolph facilities it is far from adequate Many of the school s functions are housed in 36 old wooden buildings scattered throughout the main part of Brooks more than a mile from the new complex Because of the lack of space and special equipment in the old buildings the variety of medical research laboratories have been severely limited to the new structures on the knoll

The 4 story research institute for example is fairly bursting with people laboratories and equipment It houses part of the space medicine division laboratory including the one and two man space cabin simulators supply services part of the audiology laboratory the offices of the school commandant and his staff the hot wing' housing the school s high level cobalt 60 radiation facility and an area for the study of potentially infectious agents the aeromedical library of 47 000 volumes and part of the department of microbiology cellular biology laboratories for pathology toxicology and pharmacology part of the space medicine division and the department of veterinary services

The greatest improvement offered by the new school is its academic building with 16 modern fully equipped classrooms seating 735 students an assembly hall seating another 433 and a 2 story aviation medicine examination wing The assembly hall and some of the classrooms are equipped with closed circuit TV which will enable students to observe clinical procedures without leaving their seats

A major step toward final realization of an aeromedical center built around the School of Aviation Medicine was made in January 1959 when we proposed that the school be combined with the 1000 bed U S Air Force Hospital at Lackland Air Force Base Such a move we believed would develop facilities equivalent to the research and academic portions of the aeromedical center as originally planned We further proposed that the official name of the combined facility be the Aerospace Medical Center

Early in October both proposals were officially adopted The Aerospace Medical Center was created including the School of Aviation Medicine its Center Branch the U S Air Force Hospital and the epidemiologic laboratory at Lackland The new center was assigned to Air Training Command which has its headquarters at Randolph Air Force Base

With the formal dedication this month of the new School of Aviation Medicine aeromedical science in the United States will have achieved a tremendously important goal With the facilities of the Lackland hospital and the epidemiologic laboratory and with the 7 additional new buildings we must have at Brooks America will have an aeromedical research and education center together with a modern diagnostic and patient treatment facility second to none in the world

REFFRENCES

1 Jones I H *Fly g V t s Th H man B g Se n Th ough th Ey f the Fl ght S g* J B L ppi cott C Philad lph a P 1937 p 19

Ar str ng H G *P pl d P t e f A t M d* 3d ed t W lli m & Wilki C B lt more Md 19

3 Avi v M c ne n A E F U S Wa D p rtme t Office of the Adj t t G l D um t 1004 G rnme t Pr nt g Offi Wa h g t D C F b 19 0

4 Wil r W H F ly de l pment f i ti m d c i U t d St t *M l S g o* 7 115 135 Sept 1935

5 B uer L H nd M cL W A r med l rv d the fl ght geo *M l S g* 46 40–50 J 19 0

6 Bauer L H P gr i a t o m d i *M l S g* 5 3–17 J 19 3

Bea e C L 1 *Ch l g l H t y f t t M d* U S A m A r C p S h l of A t on M d ci 1939

8 Hi R port U S A F Sch l f A t M d V 1 1 8 1918 19 9

9 W B B Sch l f A t n M d *M l S g* 69 5 5 9 No 1931

10 Rei rtz F G S h l of A t o M d c e—a d tl a *M l S g* 9 33 4 M 1943

11 Ar o H C U S A F d l pm t l t d l fi t f fli rs *M l S g* n 10 469 4 3 J 1948

1 Arm o H G H B H d St u ho H A m d al p bl m f p t l p l m t g School f A t o Med c *J A t M d* 0 383 41 D 1949

13 S ugho H H r H Bu ttner I d H ber F Wl d pa b g *J l t M d* 34 349 35 O t 1951

14 R p r F H A bo ed c Pl i c B o A Cent D p tm t f the A F c Wash gt D C 1949

15 Be F R J Att m t of p lts r c g t f t d c of nt r m bo d n pet t n g for t fic t o *J l t n M d* 4 101 106 130 Apr 1953

16 B R J *Doct th Sky Th St y f th* l *M d l As oc t* Ch les C Th m Sp gfi ld Ill 19 5 pp 0 3

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Space Begins at 50,000 Feet

COLONEL VINCENT M. DOWNEY, USAF, MC

I PROPOSE to discuss the anatomy of the stratosphere in the area of 50,000 to 100,000 feet, in order to define the aeromedical problems that face us today in flights at that height. First of all, in any discussion of high altitude flying we must define our terms. How high is high altitude? Again, since we hear a great deal of talk today about space flight, what is a space flight? Where does the atmosphere end and space begin?

From the standpoint of the geophysicist, Earth's atmosphere extends at least 1,000 km, or 600 miles. Therefore, all of the so called space flights (with the exception of some satellites) have actually been flights within the Earth's atmosphere. We are air breathing creatures, ideally suited for life at the bottom of an ocean of atmosphere. Our past achievements in atmosphere flight, in fact have been modest indeed. We have jumped a few inches off the bottom—20 miles at the most—in an atmosphere that measures at least 600 miles.

If we attempt to fly in the stratosphere we must bring along our own atmosphere, from which we derive oxygen, the essence of life itself. We need a certain barometric pressure on the surfaces of our bodies to keep body water in solution. We will be like fish out of water when we attempt to fly above 63,000 feet. When scientists bring to the surface fish that are adjusted to the tremendous pressures at the bottom of the ocean, the fish literally burst from vaporization of their body fluids.

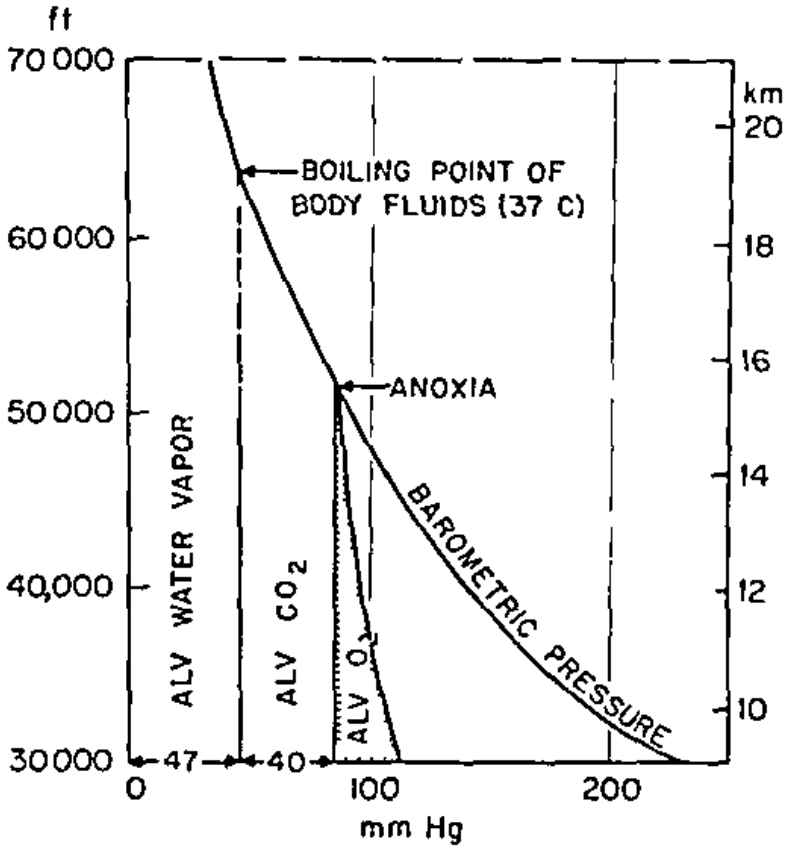
The more we contemplate space flights, the more we realize that the earth itself is an ideal space vehicle, truly traveling in space in its planetary course around the sun. In order to escape from our own Earth we must bring with us at least the essential components of our atmosphere.

The atmosphere is defined as a gaseous envelope surrounding the

From Office of the Surgeon, U. S. Air Forces in Europe. Presented on 19 May 1959 at the annual USAFE Aeromedical Symposium, Wiesbaden, Germany. Col. Downey is now surgeon, Ninth Air Force, Shaw Air Force Base, South Carolina.

solid earth It is composed principally of nitrogen—79 percent—and oxygen—20 9 percent the remainder is carbon dioxide and certain rare gases The proportions of these gases remain relatively constant at least up to 100 000 feet Air behaves like any gas mixture It has a definite weight which we call barometric pressure—14 7 lb per square inch at sea level or 760 mm Hg

The most important human consideration is that the density of air decreases rapidly Being a gas it is more dense in the lower reaches of the atmosphere and barometric pressure decreases rapidly as we ascend from sea level At 50 000 feet the barometric pressure is 87 mm Hg or 1 69 lb per square inch at 100 000 feet the



Figur 1 Relat o sh p of alveola oxygen, arbon dioxid nd water apo t b rom tric press re Alveol r xygen p e re p esent only a small portion of the t t l b rom tric pres r Alv l g e re fully turated w th wate v por which takes up a p rtial press re of 47 mm Hg A fu th parti l p ssure of 40 mm Hg p t th alveol carb n d o d ten n The al eol yg n t s s hown i the d tted ar It d c t z t pp o mat ly 50 000 f t (Afte Str gh ld)

barometric pressure is only 8 mm Hg or 0 15 lb per square inch A barometric pressure of 8 mm is actually a high vacuum In other words practically all of the mass of the atmosphere is below 100,000 feet

From the physiologic standpoint a barometric pressure of 87 mm Hg is critical (fig 1) Such a pressure—87 mm Hg—is equivalent to an altitude of 50,000 feet or approximately 15 km above the surface of the earth Hubertus Strughold[1 2] has made the statement that 15 km or 50,000 feet is the anoxia level of the atmosphere In other words, at 50 000 feet we reach the physiologic zero point in oxygen availability, even though oxygen is still found in the atmosphere

This total anoxia results from two factors First, the gases contained within the lungs are fully saturated with water vapor Water vapor exerts a barometric pressure of 47 mm Hg at body temperature In other words, this 47 mm must be subtracted from the 87 mm of barometric pressure available to supply oxygen to the lungs Secondly carbon dioxide is also present in the lungs, with a partial pressure of approximately 40 mm Hg Carbon dioxide originates from within the body itself so that it is impossible to prevent its diffusion into the alveoli We must subtract another 40 mm from our 87 mm Hg for carbon dioxide and we find that the two figures 47 and 40 exactly equal 87 mm Hg—the barometric pressure at 15 km or 50 000 feet In other words, above this point we cannot receive any oxygen into the lungs because they are already filled with water vapor and carbon dioxide

Strughold calls this a space equivalent condition Above 50 000 feet we are in space (physiologically speaking) from the standpoint of oxygen availability from the atmosphere It is true that we can depress the carbon dioxide content by altitude acclimatization but this will raise the anoxic level to perhaps 55 000 feet at the most

A second space equivalent level is a little higher (19 km or 63 000 feet) at a barometric pressure of 47 mm Hg. The water vapor pressure in the lungs is 47 mm In other words water vaporizes or 'boils at 37 C at a barometric pressure of 47 mm Hg Water boils when the vapor pressure of the fluid exceeds the barometric pressure above the surface of the liquid At sea level this phenomenon occurs when water is heated to 100 C But water also boils at much lower temperatures when the gas pressure above the liquid is decreased below the vapor pressure At a temperature of 37 C, water boils at a barometric pressure of 47 mm Hg, equivalent to an altitude of 63 000 feet or 19 kilometers—11 miles above sea level Above this point we are in space from the standpoint of the supportive pressure

of the atmosphere upon the surface of our bodies We need this ambient pressure to keep body water in a liquid state

The rapid evaporation of body fluids was pointed out by Armstrong as early as 1935 In 1936 he demonstrated the appearance of gas bubbles in the mucous membranes of surface organs such as the mouth and conjunctiva when he exposed rabbits to a simulated altitude of 63 000 feet By passing the blood from the carotid artery through a glass window he found that fluid blood became totally vaporized at 63 000 feet altitude This is the second space equivalent level of the stratosphere—at a barometric pressure of 47 mm Hg and altitude of 63 000 feet—the Armstrong line

According to Strughold these two levels are formidable enough to justify the statement that an aircrewman flying above 63 000 feet must be considered to be in space since the physiologic effects upon his body are the same as those in the vacuum of space Without assistance he is unable to breathe any oxygen from the atmosphere his body water will not remain in solution above the Armstrong line of 63 000 feet

I am amused by the oft repeated question When is man going on a space flight? The truth is that he has already flown in space or rather under space equivalent conditions Captain Kincheloe flew to an altitude of 126 000 feet Dr Dave Simons made a balloon ascent to over 100 000 feet for a prolonged period The first truly space equivalent flight was made by Anderson and Stevens who on November 11 1935 ascended in a balloon to 72 395 feet

Most of our aircraft today use pressurized cabins The cabin atmosphere is maintained higher than the ambient altitude of flight by means of a pump which compresses the outside air and increases the cabin pressure Most combat aircraft have a pressure differential of roughly 5 lb per square inch above the actual altitude of the flight

This principle of cabin pressurization must be discarded at approximately 80 000 feet The air density at about 24 km or 80 000 feet is only 0 04 percent of that of sea level At or above 80 000 feet it is technically impossible to acclimatize a cabin with compressor pumps Consequently we must resort to a sealed cabin in which the atmosphere is artificially produced inside the cabin

Sealed cabins are not new All of the astronauts have used sealed cabins Anderson and Stevens used a liquid oxygen nitrogen mixture to maintain pressure in the gondola

Jet engine themselves are plagued by the same limitations as man with respect to oxygen Jets derive their oxygen from the atmosphere for the combustion of the fuel This limits the altitude capability of jet engines flight to the stratosphere well below 100 000 feet To fly

higher we must use rocket engines, which carry along oxygen for fuel combustion

In the altitudes we are discussing—50 000 feet to 100,000 feet—aircrews are using jet aircraft with pressurized cabins It is a transition zone The flights are not truly space flights but neither are they truly atmospheric flights This is what presents our dilemma When we get combat aircraft with rocket engines and sealed cabins we will have the green light to space we will be resigned to all the problems of space flight But it is only human nature to temporize and cling to the things of the past We know that simple pressure breathing masks have sufficed up to 43 000 feet Why won t they work above 50 000 feet? Why resort to the cumbersome pressure suit which the flight surgeons advise wearing above 45,000 feet? Why can t the flyer have shirt sleeve flying, in which he sits unencumbered in a comfortable capsule smoking a cigar and adjusting the controls from time to time, or just checking on the already programmed flight profile which is automatically fed into the controls?

We would like to have these things, but they are things of the future not the present As soon as we have an aircraft cabin which is as dependable as the wing, we may discard pressure suits We may discard oxygen masks too, if engineers can produce a cabin atmosphere of 10 lb per square inch

However, until the happy day when engineering achievements have insured an absolutely safe cabin we must provide for cabin failure We must recognize the fact that today s flights above 50 000 feet are space equivalent, from the standpoint of absolute anoxia Space begins at 50 000 feet

REFERENCES

1 Strughold H Atmospheric pace equivalence *J Aviat Med* 4 0–4–4 Aug 1954

Strughold H Space equivalent condition with in the earth atmosphere—physiological aspects *Astronautica Acta* 1 3 –40 1955

3 Armstrong H G cted in Armstrong H C *Principles and Practice of Aviation Medicine* 3d edition Williams & Wilkins Co Baltimore Maryland 19 pp 34 –350

4 Simons D G I l t reaction luring Manhigh II balloon flight *J Aviation Med* 29 1–14 Jan 1958

National Geographic Society—U S Army Air Corps Stratosphere flight of 1935 in the balloon Explorer II Strato phere Series No 2 Washington D C 1936

Decompression Sickness
The State of the Art

MAJOR JOHN R PFROMMER USAF MC

DECOMPRESSION SICKNESS a disease of many names and many manifestations has been known and observed for over a century It has long been a recognized problem in diving and in submarine medicine and with the engineering advances which facilitated rapid ascent by aircraft to altitudes over 0 000 feet it became a concern of the flight surgeon We have often spoken as familiarly of decompression sickness as if its many mysteries were quite transparent and yet as ignorantly as if we had never known of the disease

Much research in decompression sickness has been stimulated by the observations of those associated with divers Kratochvil emphasized the contributions of Alphonse Jaminet physician to workers building the Illinois St Louis bridge over the Mississippi in 1870 who wrote the first American monograph in this field A multitude of physiologists and other medical men have followed (as some had preceded) with observations and with suggestions for nomenclature and causation of this mysterious affliction

Hornberger pointed out that decompression sickness was not a great problem in practical flying until the end of World War II Since that time more flying at increasingly higher altitudes has accentuated the problem in aviation both in aircraft and in low pressure altitude chambers

Differing ideas concerning the cause of the various symptoms associated with effects of environmental pressure changes on the human organism have understandably produced a variety of names for the *conditions observed The fact that the multitude of symptoms re*sulting from decompression do not always appear together or in sequence or predictable combination has not aided in producing logical nomenclature Such terms as aviator s bends high altitude

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diver's disease," "aeropathy," and "chokes" are but a few Armstrong[9] originally suggested the word 'aeroembolism,' and although this term was widely used, especially in America, he later found it to be too restrictive in its meaning Berry[1 11] today prefers the term "dysbarism' The term "decompression sickness" (Druckfall Krankheit) was introduced in the German literature in a report by Hornberger in 1941[8] and has since been widely accepted The German term "Druckfall Krankheit is not exactly identical with the American term, in that it does not include the gas pains often seen early in decompression sickness, these may result from mechanical distention of bowel without evolution of gas

SYMPTOMS SIGNS AND DIAGNOSIS

The recognized and recorded symptoms of decompression sickness are legion They range from marked fatigue after a stay at altitude to complete collapse and death Behnke[1] has written an excellent review of the symptomatology and pathology of the disease, and Adler's[3] comprehensive list of symptoms involves almost every organ system Downey[14] feels that abdominal pain is almost always the earliest complaint Scotomas, headache dizziness itching and other paresthesias of the skin are often present Mottling of the skin is associated with extensive involvement and a poor prognosis The phenomenon named "bends by divers is a frequently recognized symptom The pain of bends is usually thought to involve the joints[9 8] but Hornberger states that the pain is localized mainly in the bone endings near the joints rather than in the joints themselves Chokes' an oppressive sensation in the chest with dyspnea and cough is often associated with "bends

Lesions of the spinal cord due to rapid decompression are well known in divers and caisson workers but seem to be rare in airmen Hook[13] followed one case with spinal symptoms and comparatively slight shock whose paraplegia gradually diminished over a period of months This pilot is flying again after 2 years although some neurologic signs of his ordeal remain

Neurocirculatory collapse with unconsciousness is perhaps the gravest manifestation and is often a consequence of neglect of earlier signs and symptoms Adler felt the incidence of this was small, with 150 cases in approximately one million decompression chamber tests There were seven deaths in this series At different times Mas land[7] Adler and Berry have attempted to classify forms of collapse at altitude or in chamber reactions Britt[8] reported a case of collapse and unconsciousness with associated mediastinal emphysema, following rapid decompression Holmstrom[19] recorded several cases

of collapse during rapid decompression but feels that the collap e is not related to decompression sickne rather it is caused by the mechanical effects of rapid expansion of trapped gas es in the lungs His opinion is substantiated by Hornberger s observation that 'there is no acute decompre sion sickness The chief symptoms Holm strom lists are abdominal or thoracic pain irregular respiration pallor and sweating loss of consciousness, and transitory neurologic findings Physiologists 80 years ago observed most of the symp toms of decompression sickne s It has been said that the symp tomatology had been described almost completely by 1941 And yet today there is far from complete agreement conc rning the evidences of the dise se

CRITICAL ALTITUDE

What are the pressure differences neces ary to produce decompression ickne s? Since there is no a reement as to just what constitutes the di e se we may naturally expect a variety of opinions regarding altitudes necessary to effect it Hornberger m l etchily summariz m the Germ n studies durin World War II first stated that 36 900 feet is the lower limit for development of decompre sion symptoms l ut later noted that an empiric fi ure c f 33 000 to 26 900 feet may be given for this same lo ver limit Schneck noted that while central nervous system involvement is unusual below 30 000 feet other mani fe tatio ns have long been know n to occur below this altitude Today Berry and King state that this complex of symptoms may have severe manifest tions at altitudes as low as 22 000 feet and White s opinion is e sentially the s me Odlund recently reported f tal de compression sickne s at an altitude of 22 000 feet We may anticipate with certainty a further lowerin of the critical altitude as our under tanding of decompression sickne s incre se

CAUSATION

The consensus is now that the symptoms of so-called decompression sickness are caused mainly by the evolution of gaseous nitrogen from the blood and tis ues But there is no general agreement as to whet l er this nitro en represents autochthonous (locally evolved) gas whether it is in combin tion with other gases of the body and whether other than physic l f ctors are in trumental in its evolution In arriving at our modern concept and its variants we have een m ny inter t ng opinions of causation and contributing factors Most of th e p rol n ly do not differ greatly from the ideas of Robert Boyle wh in 16 0 after sul jecting animals to the effects of partial acuum l y u in the n ly developed air p ump wrote The little

bubbles by choking up some passages vitiating the figures of others disturb or hinder the due circulation of the blood Few today feel that we are making a mistake *post hoc* in ascribing symptoms to the observable gas It is not yet clear whether chemical and metabolic processes effect the formation of the gas bubbles[8]

Ninety years ago, Jaminet[7] believed that the syndrome resulting from too rapid decompression was caused by temperature change alteration of blood and spinal fluid pressure time of decompression and an elongated stay under increased pressure

In 1942 Behnke[5] suggested that the narcotic effect of nitrogen was partly responsible for producing unconsciousness in caisson disease This has not been important in decompression sickness associated with flying for this is an effect of compression rather than of decompression[1]

Schneck[27] feels that the multiplicity of generalized symptoms suggest scattered intracranial lesions presumably the result of gas bubbles, fat emboli, or vasospasm Haymaker, Johnston and Downey also suggest that fat emboli as well as gaseous phenomena may contribute to the etiology of decompression sickness At present there is disagreement about the significance of fat emboli, which may be found at postmortem without previous history of trauma to the deceased Haymaker and Johnston[27] point out the possible role a patent foramen ovale might play in the transport of emboli from the venous to the arterial circulation although they emphasize that this might also be accomplished via arteriovenous shunts Adler[13] Halbouty and Long[28] and Berry all imply that collapse may be due to trauma to the autonomic nervous system A pulmonary coronary reflex has been postulated as a possible cause of the oppressive sensation felt in the chest in chokes[8]

If there has been general agreement about the basic etiology of decompression sickness a multitude of contributing or precipitating factors have also been suggested Hornberger and others point out that severe pain associated with abdominal gas or bends may produce collapse at altitude and that the psychic effects of pain and of the frightening and ominous environment often associated with the disease may predispose to collapse The amount of work performed at altitude the environmental temperature, and the duration of exposure seem significant Obesity has been noted in a large percentage of subjects suffering fatal decompression sickness, and the fat nitrogen helium interrelationship is a large subject in itself We know *that* bone marrow is about 90 percent fat[2] and it is very tempting to associate this fact with the bone pain noted Age is a factor, for more efficient tissue tonus and elastic tissue forces may give the

younger person an advantage Berry and King state that lack of sleep during the previous night or the recent ingestion of fatty food or alcohol may predispose to symptoms Rosenbaum recognized no correlation between hypoxia and bends and although many might disagree few would be willing to test this hypothesis at significant altitudes

Today we may say that the symptoms of decompression sickness result from the evolution of gaseous nitrogen and possibly of other body gases during environmental atmospheric pressure changes The symptoms are the effects of the gases influence in some incompletely understood manner on adjacent or distance vascular and somatic tissue It is speculative to say more than this

Johnston[30] and others have tried to substantiate the diagnosis of decompression sickness by performing autopsies with the victim submerged in water in an attempt to demonstrate the presence of gas in tissue These efforts have met with indifferent success

TREATMENT

In the past treatment of decompression sickness has been almost entirely empiric Oxygen vasopressor drugs, and intravenous fluids have been most popular in combating collapse and unconsciousness Halbouty and Heisler favor the use of lumbar puncture and emphasize that tracheotomy may also be available

Downey Behnke and others have advocated recompression to pressures as high as 3 to 5 atmospheres for those with symptoms of decompression sickness This treatment has not been properly evaluated as yet It may prove more valuable to those suffering symptoms in an altitude chamber equipped for recompression to one atmosphere or more than to those afflicted in the air far from a recompression chamber

The operation of a low pressure chamber must include the maintenance of a medical operating area for managing altitude chamber reactions It should include a bed and materials for diagnostic and therapeutic procedure Patients with milder involvement in which symptoms disappear on return to ground level may be observed here before discharge to duty while patients with persistent bends or in collapse may be given emergency supportive treatment before being transported to the hospital

COMMENT

If we accept the dictum that space begins at 50 000 feet our pilots at the present time are entering the boundaries of space A con

sideration of the problems involved must be implicit in our studies of decompression sickness We must attempt to resolve our doubts on such matters as the equation of symptoms with the evolution of gas and consequent bubble formation, and strive to find the true nature of the malady

The increasing number of ventures into space for long periods of time raises many questions What will be the physiologic consequences of long term exposure to decreased atmospheric pressure, in an orbiting satellite? What really are the lower limits of altitude that may produce decompression sickness? What will be the nature of the atmosphere the space man will combat? How much nitrogen will it contain? What type of pressure suit will the space man wear? These are only a few of the questions that will have to be answered They are significant questions even now

SUMMARY

Literature regarding investigation and case reporting of decompression sickness is reviewed Present knowledge concerning etiology of symptoms of this affliction is incomplete, although it is generally agreed that body nitrogen evolved during atmospheric pressure changes plays an important part It is emphasized that a consideration of the problems involved in space flight is implicit in further investigation of decompression sickness

REFERENCES

1 Flight Surgeon's Manual U S Air Force Manual No 160–5 Department of the Air Force Washington D C July 1954

2 Ames S W Flight surgeon's role in partial pressure suit operation maintenance and training *U.S Air Force Medical Service Digest* 9 2, Mar Apr 1958

3 Belcher, C D Man must breathe *Mil Med* 124 102–110 Feb 1959

4 Bert P *Barometric Pressure* Translated from French by M A and F A Hitchcock College Book Co Columbus Ohio 1943

5 Masland R L Injury of central nervous system resulting from decompression to simulated high altitude AAF School of Aviation Medicine Randolph Field Tex Project No 481 7 Oct 1946

6 Roxburgh H L and Ernsting J Physiology of pressure suits *J Aviation Med* 28 260–271 June 1957

7 Kratochvil, C H Contributions of Alphonse Jaminet to understanding of decompression sickness *J Aviation Med* 2 79–83 Feb 1956

8 Hornberger W Decompression Sickness In *German Aviation Medicine World War II* Vol I Prepared under auspices of Surgeon General of the U S Air Force by U S Air Force School of Aviation Medicine for Department of the Air Force Washington D C 1950 pp 384–394

9 Armstrong H G *Principles and Practice of Aviation Medicine* 3d edition Williams & Wilkins Co Baltimore Md 1952

10 BERRY C A Pe l comm i ti n
11 BERRY C A S dysba ism i Al F ce pe ati s an l t i i g *U S Armed Fo ces M J* 9 9 –948 July 19
1 BEHNK A R Decomp es i k es *M I M d* 11 1 S pt 19
13 A LER, H F \ u cir ul t y C llap e t Alt tud U S Al Fo e School of A t Medici e Rand lph Fi l l Tex Spec al Project, J e 19 0
14 D WNEY \ M I so al uni ti
1 D co St K Cli leop ath l gi co f e U S Al F r e H sp tal, Wright Patters n Al F ce Base Ohio *U S Armed F ce MJ* 6 1 8 1 9 Dec 19
16 HOOK O Dy b i m ife ted b ant pl l art nd me *J ir t Med* 9 0 0–43 J ly 19 8
1 M L R L. Re i w f es f collap occurri g i ltit de ch m be \AF S hool f A i t n Medi i R nd lph Field T P ject 1 10 A g 1943
18 B TT H R M li ti l mphy m f llowi g apid decomp i n a c e po t Repo t d t 30th nnual Ae ed al As ociati n n eeti g Ap 9 19 9
19 H TR F M G C llap l ing pid decomp i *J A ti M d* 9 91 96, Feb 19 8
90 SCH CK S A Decomp i n ickn s t medium ltitu l *U S A d F ce M J* S 1366–13 3 S pt 19
1 BER Y C A and KI A H S e dy b ri in tu l l im lated flight *U S Arm d F rce MJ* 10 1 1 Jan 19 9
2 WHITE, C S a l B \ O O JR (dit) *Phy ic t Med ci e of the Upper Atm sphe St dy of th Aerop* Proceedings f ym po ium n i hy l and medicin of pi e tm ph re held l at S n Ant ni Tex 6–9 \ embe 19 1 spo so ed by Al U l rsity School f A i ti Medi i R l lph Fi ld T U l \ w M ico l re s Alt q rque \ M 19
23 O CN L T F t l decomp es i n ill es t ltit l f 2 000 feet R ported t 30th annu l Aeromedi l A oci ti n meeting Aj S 19 9
4 B LE, R. New i en atical pe i t abo t esi irati *I h l T t* 9011 16 0
B NK A R Sy i in h t ial n ed i ffect f l igh i es p ti n a l f t t f compr ed ai ill *M Cl \ rth A ca* 6 1 13–1 3 Jul 194
96 H YMAKER W J I ST S A D a l D w EY \ M Fatal lecs mi es i i k es du i g jet aircraft flight li leopath l gi al t l f cases *J A t M d* 9 1 F b 19
9 HAY KER, W n l J S TON A D I th l gy f dec i es i i knes cs mp f l i in al with th i c i son w k rs i li ers *M I M d* 11 S 0 S pt 19
8 H BOUTY M R l LOS D R \ eurocl ul t y cc llaj I l raft fl ght po t f ase *J A ti M d* 4 301–30 Aug 19 3
99 ROS M D A i discus i n lecompres i n i k es
30 J H A D i discu i n decompres i n i knes
31 H BO TY M R l HEI LER, J J S oci l t y collapse at im l ted ltit d *U S Arm d F rce MJ* 6 1 3–13 0 S pt 19

Break Off
A Phase of Spatial Disorientation

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AVIATION is a relatively young science as measured in time By its progress, however it appears to stride above the earth as a colossus As we put more pilots into the air, flying more hours and traveling farther away from the earth s surface, we are likely to overhear them discuss new and peculiar sensations and experiences So far we have not reached that stage in our knowledge where we can complain because there are no more syndromes to describe symptoms to classify or problems to solve Recently the new term break off has appeared in the literature This has been defined as the feeling of physical separation from the earth when piloting an aircraft at high altitude' [1] With this definition the group of symptoms to be discussed can belong only to aviation Yet when unusual attitudes symptoms, or sensations occur under unusual circumstances in a very select group we should begin collecting information to discover whether these circumstances are unique or whether antecedent experiences have been recorded and noted to determine the origin effect and direction of these symptom clusters

A study was undertaken to determine the significance of the term break off as it gained in prominence and came to the attention of aviation medicine officers Of 137 pilots interviewed and questioned *concerning this phenomenon 37 percent reported experiencing* the break off effect described as a feeling of being isolated or detached sometimes accompanied by a sense of exhilaration Of those experiencing the break off effect 38 percent noted anxiety and fear 71 percent reported loneliness and 90 percent stated that break off occurred when flying alone at high altitudes Another significant point was that break off occurred more frequently when the pilot had time on his hands These sensations took place only in jet aircraft and the experience level of the individual pilot did not appear to be a factor in causing the break off effect Similar observations have been made by scientists of other air forces Bennett examined pilots who experienced this effect and who reported feelings of confusion apprehension and false sensations in solo flight above 20 000 feet Onset

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of the symptoms occurred at least an hour after the aircraft was aloft All pilots felt isolated and as if in an unrealistic and dream like state A Netherlands Air Force pilot reported severe symptoms experienced while piloting a conventional aircraft in cloud layers where points of reference were nil the air was smooth and there was only minimal sensory stimulation

As one seeks precipitating factors that could produce the foregoing symptoms it would appear that the most important element is that of isolation Isolation must be considered as a subjective as well as an objective state By subjective state is meant a state of realization or appreciation of being detached from or cut off from the familiar The objective aspects should consider the normal sensory stimuli that impinge upon the body and that need interpretation evaluation and action Reduction of these too would isolate the individual As we consider both these aspects of isolation either phase would be—and apparently has been—capable of producing a gamut of symptoms ranging from very mild transitory ones to markedly severe and disorganizing changes The term break off although not scientific is interesting and descriptive implying an end almost a feeling of no return into an unknown and somewhat frightening void

Although for many years individuals have recorded their experiences with isolation and its effects little attention was paid to them until larger segments of the population were subjected to a voluntary and directed isolation Explorers and other scientists have isolated themselves and have written about their experiences and the dramatic psychic effects they noted during their course such as Byrd's account of his isolation in the arctic region and Bombard's of his trip across the ocean on a raft During and after the Korean conflict great concern arose over the changes that could be produced within the prisoners of war This stimulated much research on the effects of isolation upon the individual and the group Numerous experiments had been carried out in an attempt to understand evaluate and predict what occurs in periods of isolation In one such research project the number of sensory input stimuli was reduced by submerging subjects in a constant temperature water bath permitting them to breath only by means of underwater equipment About 45 minutes after submergence a review of the day's events preceding the immersion appeared This was followed for the most part by a tranquilizing effect as the subject relaxed and was similar to that noted when disturbed patients are placed in hydrotherapy tubs Then extremely dramatic changes occurred described as a subjective tension progressing to eruption of

highly charged personal material that was quite unpleasant and distasteful to the individual If the individual remained submerged in the water bath up to 3 hours, there were hallucinatory experiences Another experimental effort consisted in having subjects lie on a bed with frosted glasses[7] covering their eyes After several hours, directed and organized thinking became progressively more difficult, suggestibility was greatly increased, and the need for extrinsic sensory stimuli and body motion became more acute Most subjects found they could not tolerate the experiment for more than 72 hours Those who remained longer than 72 hours usually developed overt hallucinatory experiences and delusions, similar to those reported from mescaline and lysergic acid diethylamide (LSD)

In research on experimentally produced deafness, it was found that there were marked individual differences when cotton plugs dipped in petrolatum were placed in the ears of subjects for a period of 3 days By and large there was inability to speak with normal volume, decreased motivation for studying, marked irritability, exaggerated response to stimuli, and a desire either to withdraw from situations or to rush precipitately into them Feelings of personal inadequacy were also expressed Other types of research have consisted of putting men in isolation chambers[8] furnished with a bed, chair chemical toilet and refrigerator for varying periods of time The results were similar to those from other isolation experiments One does not necessarily have to establish elaborate experiments, however, to be able to appreciate the existence of emotional changes in individuals who have been subjected to altered environments It is not uncommon on ophthalmologic services, especially in dealing with older patients who have undergone bilateral cataract operations with both eyes covered to have the patient become grossly confused, disorganized, and disoriented On many occasions workers in induction stations have noted varying degrees of depersonalization among new recruits arriving at a strange and untried environment This has also been observed in men newly arrived at overseas stations, where the subject realizes that he is physically present in the area but does not have complete feeling of having arrived On pediatric wards the child separated from his mother may experience feelings of anxiety and fear that may culminate in the classic signs of a depression

To appreciate the effect of a reduction of stimuli, a very simple test would be to walk into a soundproof room such as an audiometer room and sit perfectly still for a few minutes Where there is an observation window outside the range of the individual seated within, it is not uncommon to notice tension in the subject It has often been

observed that as he leaves the room he breathes a sigh of relief

From birth to death man is constantly bombarded by numerous stimuli of varying intensities and descriptions He reacts to these or ignores them depending on his immediate frame of reference and needs of the moment He is usually seeking or attempting to create a comfortable and familiar environment Confronted with unexpected or unusual environmental conditions he reacts none too graciously and attempts to handle the situation in the best way available to him It would appear that symptoms arise when his grasp of reality becomes loosened or threatened If the situation continues so that he can no longer cope with the environment he struggles to re establish a familiar pattern and symptoms develop Certainly the production of hallucinatory experiences of a visual or auditory nature would be an effort on the part of the affected individual to project a familiar sight or sound into his environment in an attempt to regain homeostasis

That portion of the person concerned with the interpretation of external or internal stimuli and of objects and object relationships has been termed the ego The ego is the portion of man that permits him to test situations receive stimuli make choices ignore come to decisions and prescribe necessary actions When this ability is interfered with undesirable symptoms and syndromes appear In order to live and function man must associate with others in a society and culture that he has developed Any variation or deviation from this pattern he would consider unnatural and intolerable to life and would attempt to overcome Therefore isolation which is unnatural whether it is subjective objective or both threatens the ego and may call forth a stream of activity It would seem that reduction in stimuli or loss of the feeling of belonging causes a loosening or dissolving of ego function becoming manifest as disorganization with reduction in controlled ability to select and interpret and to act in a real and appropriate manner Because ego has as its windows the special sensory organs symptoms can and may be projected to any one of these Thus in the visual field position and relation of objects may vary and change In vestibular function vertigo may occur Kinesthetic sensation may become distorted Auditory symptoms may arise or sounds become distant or distorted Certainly personality factors would play an important part in the production of these symptoms as far as the time of their occurrence is concerned In persons with well organized ego boundaries and good self concept it will in all probability take longer for symptoms to be produced or the symptoms themselves may be of a milder nature

and not as intense in degree as in those with poorly defined concepts In a certain percentage of individuals this phenomenon is probably a reaction that we can expect because of the ego and because of the human concern with preventing change and keeping situations in the internal and external environment constant It may well be that in some ego structures with the ability of narrowing the field of stimuli the complex called fascination develops At the other end of the spectrum, with the lack of stimuli for preservation of ego we have a dissociative state—break off—with symptomatology

The circumstances we have described that gave rise to the break off phenomenon were of short duration, so that subjects could at almost any time return to a good reality testing state Yet, let us for a moment consider the future, when persons may be confined in extremely narrow environments possibly motionless for long periods of time, physically isolated from familiar sensations If, as experiments show this dissociation of ego function occurs during short periods of exposure what will happen if subjects are required to maintain themselves for weeks or months in total isolation from a friendly and familiar environment? Outer space offers complete isolation, where even the accustomed blue of the sky is absent the sensation of motion varies, and nothing familiar is present Perhaps we shall have to incorporate certain stimuli and human companionship into this isolated space to prevent this disorientation As far as selecting individuals for trips into outer space is concerned, I know of no new or better criteria than those we now have It would seem that the individual with a healthy personality and with well integrated ego function and self concepts would be as he has always been for aviation the ideal individual for future space travel

REFERENCES

1 Clark B and Graybiel, A Break-off phenomenon *J Aviation Med* 28 121–126 Apr 1957

2 Bennett A. H H Sensory deprivation in aviation Lecture Oct 1958 Royal Air Force Institute

3 Palthe, P H Solitary confinement Lecture Sept 1958 Aviation Medicine Research Institute Netherlands

4 Byrd R E *Alone* G P Putnam's Son New York N Y 1938

5 Bombard A *The Voyage of the Hélène* Simon & Schuster New York, N Y 1954

6 Lilly J C Mental effects of reduction of ordinary levels of physical stimuli on intact healthy persons *Psychiat Res Rep* (no 5) 1–28 June 1956.

Solomon P Leiderman P H, Mendelson J and Wexler, D Sensory deprivation a review *Am J Psychiat* 114 3. –363 Oct 1957

8 Ley R Z. Ruff G E and Thaler V H Studies in human isolation *J Aviat Med* 1 169 230–239 Jun 1 1959

Visual Problems Above 50,000 Feet

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SPACE MYOPIA IS in my opinion the most serious visual problem to be overcome in high altitude flight for it presents a true physiologic handicap that can drastically reduce the effectiveness of air to-air search High altitude flight at supersonic speeds taxes the pilot s visual capability to the maximum so far as air to air search is con cerned Any factor that will reduce this visual capability limits the effectiveness of manned aircraft as a weapon for transcendence in the air

Space myopia is actually a misnomer the correct term should be empty field myopia or empty visual field An empty visual field may be defined as a visual field that contains no detail upon which the eye can focus The cloudless sky at high altitude fulfills the require ments of this definition Other examples are total darkness fog or a uniformly overcast sky It was shown by Whiteside in collabora tion with Campbell that in the presence of an empty visual field subjects cannot relax accommodation completely Accommodation remains in a state of constant activity fluctuating about a level of 0 5 to 2 0 diopters The person with normal eyesight is thus unable to focus at infinity if infinity contains no detail subject to sharp focus Under these conditions unable to focus further than a point about 1 to 2 meters away he becomes effectively myopic by this amount

After demonstrating that empty visual field myopia is a fact and not a fantasy Whiteside went on to demonstrate its effect upon the minimum visual angle for a distant target Tests performed on 63 patients showed that a target had to be twice as big to be detected in an empty visual field as in a visual field with detail at infinity Dou bling the minimum visual angle is associated with 0 75 diopters of myopia

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From USAF Hospital AFO 733 New York NY Presented 10 May 1959 at the USAFF Aeromedical Symposium Wilbur Ge ary

Let us consider what doubling the minimum visual angle means in effectiveness of direct visual air to-air search. If a pilot has 20/1 vision he is able to discriminate a visual angle of 4 seconds of arc. An F 80 fuselage will just fill this angle at a distance of 4 miles. At distances greater than this a pilot may see a speck in the sky but will be unable to discriminate its details. If he has the previously mentioned 0 75 diopters of myopia this maximum recognition distance will be halved to only 2 miles

Having now introduced the subject of minimum visual angle and the resultant visual deficit brought about by doubling it, let us apply this to a hypothetic case of air to-air search We are in a maximum performance aircraft flying at a speed of 1,500 miles an hour when an object appears in our peripheral field of vision It will take approximately 1 4 seconds, during which time our aircraft will have traveled 3 682 feet, before we can actually recognize the object. Once we have recognized the object if we now want to move the center of our aircraft, the motor reaction time will be about 400 of a second In this time the aircraft will have traveled an additional 1,050 feet, for a total distance of 4 732 feet from extrafoveal appearance to control movement on the aircraft. These figures were first published by Strughold[2] in October 1949 I only mention them now to emphasize the problems of air to-air search at high speed and to help impress on all of us the truly tremendous loss in visual effectiveness that is incurred from empty field myopia.

In considering the problem of glare in high altitude flight the type of light its direction and the contrast between brightly and poorly illuminated surfaces are all important. At altitudes up to 100,000 feet we have qualitatively the same kind of light we have at ground level but quantitatively there is a progressive light increase with increasing altitude On the surface of the earth on a clear day the illumination from the sun is about 10,000 foot candles at 5 miles 11 800 foot candles at 10 000 feet and 17,000 foot candles at 100,000 feet The illumination in space is about 17,000 foot candles If we start flying above the ozone layers—that is, above 120,000 feet—ultraviolet light in the 200–300 millimicron band will present a hazard as the ozone layers effectively filter out this light Specifically, the 200–292 millimicron band is the most dangerous to the eye because it is the wave length band that produces the severe keratoconjunctivitis associated with welding

Because light is scattered by molecules of air, dust particles, and moisture and because these particles are less dense in the higher altitudes the distribution of light changes somewhat The sky at

pears darker and there is less light on the instrument panel and interior of the cabin Contrasts become extremely large There may be a ratio of 1 to 60 000 or more between the brightest and the dimmest portion of an exposed area At an altitude of 40 000 feet and above all cloud formation the sky is white at the horizon decreasing in luminosity toward the zenith at which point it appears as a rather dark blue Solar illumination being at 30 of arc from the zenith as altitude varies from 10 000 to 100 000 feet the sky brightness at the zenith diminishes from about 500 millilamberts to 10 millilamberts. It becomes obvious therefore that with the greatest illumination at the horizon and the smallest at the zenith the contrast between sunlight and shadow areas at high altitudes is greatest in the lower parts of the cockpit which are in line only with the darker sky near the zenith

One of the visual complaints in high altitude flight is that of cockpit haze As this is not limited to the lower areas of the cockpit it must be attributed to factors other than that of altered luminance of the instrument panel The lens shows maximum sensitivity to wave lengths of 360 to 340 millimicrons and the intensity of ultraviolet radiation between 300 and 400 millimicrons at 40 000 feet is about three times that at sea level Thus fluorescence in the lens of the eye might be responsible for this visual haze a possibility investigated by Whiteside However when at high altitude the eyes were covered by a filter that cut off 90 percent of this ultraviolet radiation there was no change in the subjective haze

The visual system is particularly sensitive to oxygen lack Even at 4 000 feet diminution in absolute sensitivity of the dark adapted eye to a light stimulus has been reported In pressurized aircraft during high altitude flight a relative anoxia corresponding to altitudes of 8 000 to 10 000 feet may exist A slight degree of anoxia has been shown to affect day vision as well for example after looking at a bright cloud floor or presumably even at a bright horizon the time that a subject requires to recover sufficient retinal sensitivity to see instruments in shadow is increased In flight the usual practice is to glance at the inside of the cockpit for less than 5 seconds before returning the gaze to the exterior scene This is insufficient time for a pilot to recover from the dazzle of a bright cloud floor In fact 1 to 2 minutes may be required for the subjective haze to disappear Whiteside believes that this haze results from slight degrees of anoxia that are otherwise tolerable and that apparently have no effect upon judgment or other higher cerebral functions. This minimal anoxia however has the visual effect of increasing the

duration of the positive afterimage of a cloud floor, thereby producing a persistent haze over the visual field at high altitude

The complaints of glare per se result from several factors (1) The reversal of normal light distribution in the visual field, the bright sky at high altitude being below instead of above This difficulty is accentuated by the fact that the eye has some protection against light from above by the bony formation of the face which is of little value in respect to light from below (2) The high luminance of the exterior as compared with the luminance of the interior of the cockpit (3) Possibly the blue color of the sky, for it has been shown by Ivanoff[5] that a blue source produces more dazzle than does red, yellow, or green (4) The greater sharpness of shadows cast by the sunlight at high altitude This may increase simultaneous contrast and accentuate what has been shown to be, at most, a slight increase in contrast between sunlit and shadow areas in the upper part of the instrument panel

SUMMARY AND CONCLUSIONS

Some of the visual problems of high altitude flight have been discussed Emphasis has been placed on practical aspects of these problems rather than on laboratory procedures and research technic Empty field myopia and its significance as a deterrent in air to air search is stressed as the gravest visual difficulty to be surmounted

I would like to see some research performed to test the effectiveness of a lightweight visual shield, the upper 60 percent of which would be a yellow filter for distance use with a lens strength of −0 2 5 diopters and the lower 40 percent a clear glass or plastic for close use with a lens strength of + 25 diopters to supplement glasses and to be utilized only at higher altitudes

REFERENCES

1 WHITESIDE, T C D *The Problems of Vision in Flight at High Altitude* Butterworths Scientific Publication London 19 pp 30–33 4 –50 80–9? 10 –113

2 STRUGHOLD H Human time factor in flight *J Aviat Med* 20 300–307 Oct 1949

3 BYRNES V A Vision at high speed and altitude *Aero Engng Rev* 1? Apr 1953

4 WHITE C S and BENSON O O Jr (editors) *Physics and Medicine of the Upper Atmosphere* University of New Mexico Press Albuquerque N Mex 19 pp ? –?8

IVANOFF A Au sujet de la composante inhibitive de l éblouissement *C R Acad Sci Paris* ?4 1846–1848 1947

The Gravity Free State on a Space Platform

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IT IS GENERALLY ASSUMED that on a space platform orbiting about the earth without drag outside the atmosphere the gravity free state is realized in the most perfect manner While this proposition is entirely valid for the time scale and the motion involved in physiologic processes it is not rigorously correct from a theoretical standpoint As will be shown below the gravity free state in an orbiting vehicle of finite dimensions prevails only in its center of gravity At any other point the balance of centrifugal force and gravity attraction is not complete Minute as the difference is, it is by no means of mere academic interest but has drastic consequences as soon as free motions of objects on a time scale of several minutes or more are involved

That the foregoing statement is true can be seen by simple general reasoning aside from the rigorous proof to be given in the following discourse In the true gravity free state as it would prevail for example in and on a vehicle moving without propulsion in intergalactic space far away from any center of gravity attraction one would expect that Newton's Lex I (*per eversa e in statu movendi uniformiter in directum*) would be fulfilled rigorously and the ideal situation would pertain Indeed any object given a linear speed relative to and away from such a ship will persist in that state of motion for any length of time or distance That a similar proposition does not hold for an object thrown off from an earth circling satellite is obvious Whatever the direction and initial velocity of the throw may be the object will always travel on a trajectory namely the new orbit determined by the changed parameters A permanently rectilinear motion could result only if the velocity would be infinitely large

The foregoing relationships are well known and elementary The

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following discourse dealing with them does not claim to convey basically new information Yet it was believed that a need exists to present these relationships in easily comprehensible terms with the aid of concrete examples, since so far they are only implicitly contained in the literature with the initiated reader left to derive them from the differential equations

THE BALANCE OF FORCES IN A SATELLITE OF FINITE SIZE

Figure 1 describes the basic geometry of the phenomenon under discussion The satellite vehicle, assumed to orbit in a perfect circle at a height of 500 kilometers above sea level is depicted as a rectangular cabin The balance of forces keeping the satellite in orbit is rigorously fulfilled only for its center of gravity P, as will be shown presently The center P circles about the center of gravity attraction C in the middle of the earth at a distance of $6\,370+500=6\,870$ kilometers If we assume that the vehicle is not tumbling but maintaining its attitude in 'absolute' space, as indicated in the left hand graph of figure 1 it is seen that a point P at a distance $\Delta r=10$ meters outside the center of gravity P describes a circle of exactly the same radius as P, yet not about the center C but about a new center C located 10 meters away from C A similar situation exists for a point P_1 at a distance $\Delta r=10$ meters inside As the two points P and P_1 are engaged in exactly the same state of motion as far as linear speed, angular speed and radius of orbit are concerned the centrifugal forces are exactly equal The respective gravitational forces however are not since all three points have different distances from the center of attraction P is by $\Delta r=10$ meters farther away from C than is P and P_1 is by the same distance closer Hence the balance of forces responsible for the gravity free state is not fulfilled in P and P_1 In P a radially outward directed gravitational force will be felt in P one radially inward

To be sure the differences under discussion are minute The gravitational force in P is $F=k/r^2$ in P it is $F=k/(r+\Delta r)$ and in P_1 it is $F=k/(r-\Delta r)$ Since $\Delta r/r$ is a very small magnitude it is practical to factor out r in the bracketed terms $(r\pm\Delta r)=r^2(1\pm\Delta r/r)^2$ The quadratic term $(\Delta r/r)$ then is small by higher order and can be neglected in the evaluation The outward force in P is easily seen to be off balance by the factor $2\,\Delta r/r$ This corresponds to a force of $2.5\times10^{-6}G$ where G signifies the acceleration of gravity at sea level on the earth The force I_1 is found to be equal to that in I but acting in the opposite direction, that is toward the center of the earth

SATELLITE MAINTAINS ATTITUDE IN SPACE

SATELLITE MAINTAINS MOON LIKE ATTITUDE

If the assumption of the vehicle maintaining its attitude is abandoned and a "moonlike" state of motion is introduced in which the satellite always points the same side toward the earth, the disturbance of the balance of forces in P and P_1 is slightly greater than in the first case. This can be seen from the right hand graph of figure 1. C is now the common center of rotation for all three points, yet the three radii are different. P describes a circle of radius $r+\Delta r$ and P_1 one of radius $r-\Delta r$. As a consequence, not only the gravitational force is smaller in P but, in addition, the centrifugal force is larger with both increments acting in the same direction. A similar situation exists in P_1. Noting that the squares of the respective velocities of P and P_1 are $v^2(1+\Delta r)/r^2$ and $v^2(1-\Delta r)/r^2$ where v is the orbital velocity of the center of gravity of the satellite, and remembering that the centrifugal force quite generally is equal to the square of the peripheral linear speed divided by the first power of the radius, $F=v^2/r$, one obtains the centrifugal force in P as $Fc_0=[v^2(r+\Delta r)/r^2]/(r+\Delta r)=(v^2/r^2)(r+\Delta r)=(v^2/r)(1+\Delta r/r)^2$. In P_1 the force is equal to the same expression when the plus sign is replaced by minus. It is seen that the term v^2/r in these equations represents the centrifugal force in P and is at the same time equal to the gravitational force in P since for P both forces are equal. According to the square law, the gravitational forces in P and P_1 are by the factor $r^2/(r+\Delta r)^2$ or $r^2/(r-\Delta r)^2$ respectively smaller or larger than the gravitational force in P. Neglecting again the quadratic terms of $\Delta r/r$ and applying the formula of approximation calculus that $1/(1+\Delta r/r)=1-\Delta r/r$ one obtains the resulting unbalance factor in P and P_1 as $3\Delta r/r$. Expressed in G units this equals $3.75\times10^{-6}G$ acting radially outward in P and radially inward in P_1.

The question might be asked whether a state of rotatory motion of the satellite can be found at which for any point inside the vehicle the balance of forces is fully preserved. A detailed analysis of this proposition shows that such a full balance of forces in P, P and P_1 requires respective orbits and speeds which would continually increase the mutual distances of these points from each other.

Again, it should be emphasized that for the functioning of physiologic and sensorial processes the deviation from zero gravity is subliminal by a large margin. Furthermore this minuteness of the effect is not contingent to the special system of an earth circling satellite, but derives fundamentally from the smallness of the universal constant of gravitation which equals 6.68×10^{-8} dyne cm^2/g^2. Due to this smallness tremendous masses, such as the 5.97×10^{27} grams of the planet earth are required to produce sizeable gravitational

forces In comparison to such masses any man made vehicle will always be negligibly small and so will be the disturbance of the balance of forces in it

The foregoing analysis is incomplete insofar as it investigates only the state of motion for points on the intersect of the plane of orbit with the satellite vehicle or in terms of figure 1 in the plane of drawing The satellite however is a solid object containing also points outside this plane that is points above and below the plane of drawing in figure 1 The analysis for these points is more compli cated inasmuch as the vector of the gravitational force pointing to ward the center of the earth in this case no longer lies in the plane of orbit This leads to a three dimensional force diagram Inasmuch as no basically new phenomena other than more intricate paths of motion of free objects are introduced by this proposition it will not be investigated here

A further point should be mentioned The reader is likely to wonder what attitude the orbiting space cabin in figure 1 actually would a sume if no artificial means of stabilization such as flywheel or spinning the entire vehicle were applied If the vehicle in the moment of injection into orbit shows no rotatory or tumbling motion whatsoever and maintains its position in absolute space (fig 1A) it will rotate relative to the radius vector connecting the respective centers of gravity of the earth and the vehicle The sen e of this ro tation will be counterclockwise if the orbital motion is clockwise and vice versa It can be shown that in any position during this apparent rotation in which the long axis of the vehicle does not coincide with the orbital radius vector a force couple acts on the vehicle which tends to re tore coinciding position The torque of this couple alter nates twice during a full orbital revolution between clockwise and counterclockwi e direction As a consequence the vehicle will execute a pendulum type motion about the coinciding position This motion is called libration.

One might object that under these circumstances the two alterna ti e attitudes di cu ed in figure 1 are rather unrealistic With regard to this argument one should consider that a manned vehicle at least at a more ad anced state of satellite technic is likely to be equipped with artificial stabilizing means to avoid disorientation of the pilot For the latter purpo e the attitude in figure 1 A seems the best choice The following kinematic analysis therefore is carried out for this ca e.

KINEMATICS AND DYNAMICS OF CONSORT MOTION

The peculiar situation that a radial gradient of apparent gravitational force, though of extreme smallness, exists in an orbiting satellite, changing from negative values in the earth near portion of the vehicle to zero in the center of gravity and to positive values in the outer portion, has the consequence that the kinematics and dynamics in and on such a vehicle are profoundly different from those on a ship in a truly gravity free region far away from any heavenly body This difference is a very real one and easily recognizable as soon as motions on a time scale of minutes are involved To the disorientation due to weightlessness, it adds, for a man in such a vehicle, the strange phenomenon of twisting trajectories of floating objects inside and outside the ship into tortuous circular or spiral paths The following discourse tries to derive two basic types of these trajectories Though these two cases do not cover all possible curves by far, they represent the two main prototypes and convey an idea of the complexity of the motions involved

A concrete case will be used to define and explain the basic terms and relationships We assume that two manned satellite vehicles, 2 kilometers apart are circling in exactly the same circular orbit of 500 kilometers height The front man wants to pass a piece of equipment on to his wing man' 2 kilometers behind At first sight one might be inclined to assume that all of the front man has to do is to toss the gear gently backward" in the direction toward the second ship Since the gravity free state prevails for both ships in orbit, the gear, one would think, would slowly cross the distance and arrive at the second ship with the same relative speed with which it had been launched so that it could be easily caught by hand The subtle error involved in this argumentation is that the object tossed "back" assumes a slightly lower speed than the satellite from which it was launched As a consequence its orbital parameters change into those of an ellipse and it starts falling toward the earth When it finally has changed its relative peripheral position by 2 km it will be considerably below the second ship, *that is closer to the earth*

The correct way to accomplish the task *is to toss the object gently* "upward, that is, radially outward *It will assume an elliptical* orbit swinging out farther radially for a quarter revolution, but will return thereafter and intersect the main orbit At the same time, its velocity on the outward part of its orbit will be smaller and if the correct launching speed has been chosen the object will pass through the intersect with the required delay of 2 kilometers.

A still more paradoxical way to achieve the goal is to throw the

object forward that is exactly in the opposite direction of where it is intended to go Again, it will swing out further and lose speed after the short initial gain The new orbit in this case intersects the main orbit after a full turn The transfer therefore takes twice the time as compared to the upward throw yet requires less launch ing speed

In addition to the two limiting cases just de cribed any launching angle in the full 90 range between the upward and forward direction is equally suited to accompli h the end if the correct launching speed has been chosen It will be een that these launching speeds are surprisingly small yet produce displacements of many kilometers in relative orbital position radially as well as peripherally There fore the small reservoir of mu cular force of man represents a most precious and powerful means for the transport of objects of various sizes over the indicated ranges Near at hand is the idea of design ing a spring loaded launching device to be recharged by man which will lend to this gratis propellant the necessary extreme accuracy of aiming and launching speed As is shown below this speed would have to be extended down to the range of millimeters per second and below if distances of only a few hundred meters were involved

We proceed now to a full analysis of the two limiting cases Since the forward throw is somewhat simpler kinematically it will be treated first Figure 2 depicts the geometri situation The thrown object from now on will be called the con ort It is indicated in the graph by a solid circle The atellite vehicle from which the consort is thrown (launched) is marked by two circles with connecting bar For simplicity s ake the terms up down above below forward backward will be u ed in reference to the satellite at position zero de rees (position "North in fi ure) It will be a sumed that the con ort is launched in a forward direction with a relative speed of 1 meter per econd As oon as the con ort has assumed the new slightly larger speed it will go into a new orbit of slightly greater radius in order to preserve the balance of forces The centrifugal force is equal to a /r If it is to maintain its value an increment in require a corre ponding quadratic increment in r The consort therefore swings out in its new orbit farther away from the center of gra ity thus increasing its potential energy and defraying this in rease in turn from its kinetic energy Its original speed in rement Δ = 1m/sec therefor decrease o that finally the speed of the consort bef re laun hing that i the atellite peed a is re tored This ho r loes not restore the balance of forces since the distance of the cou rt fr m the enter of r tation is now larger than before

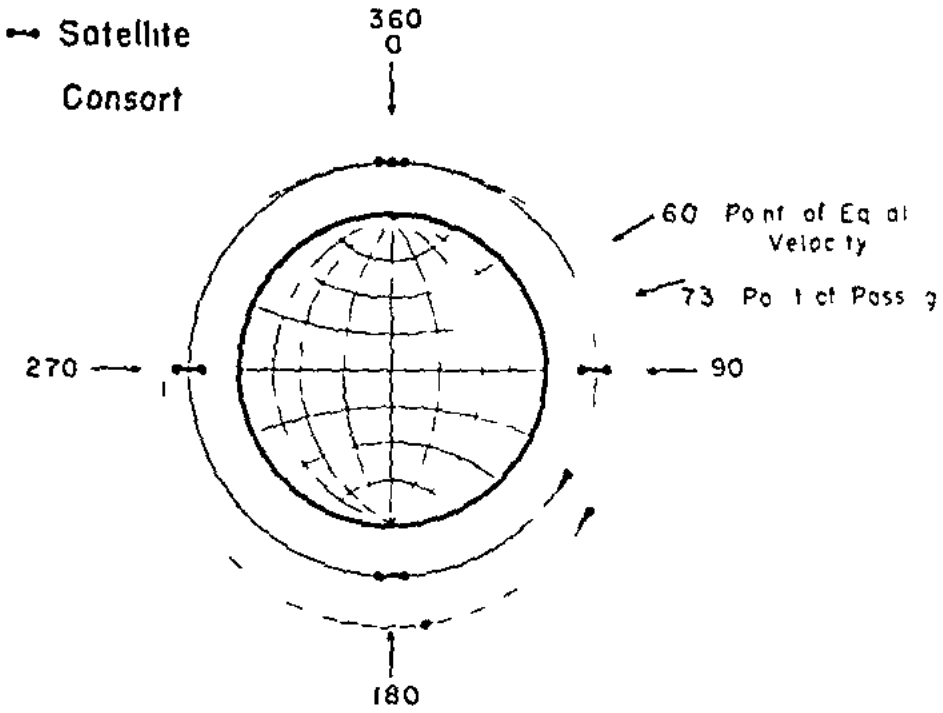


Figure 2 Consort orbit for tangentially forward throw

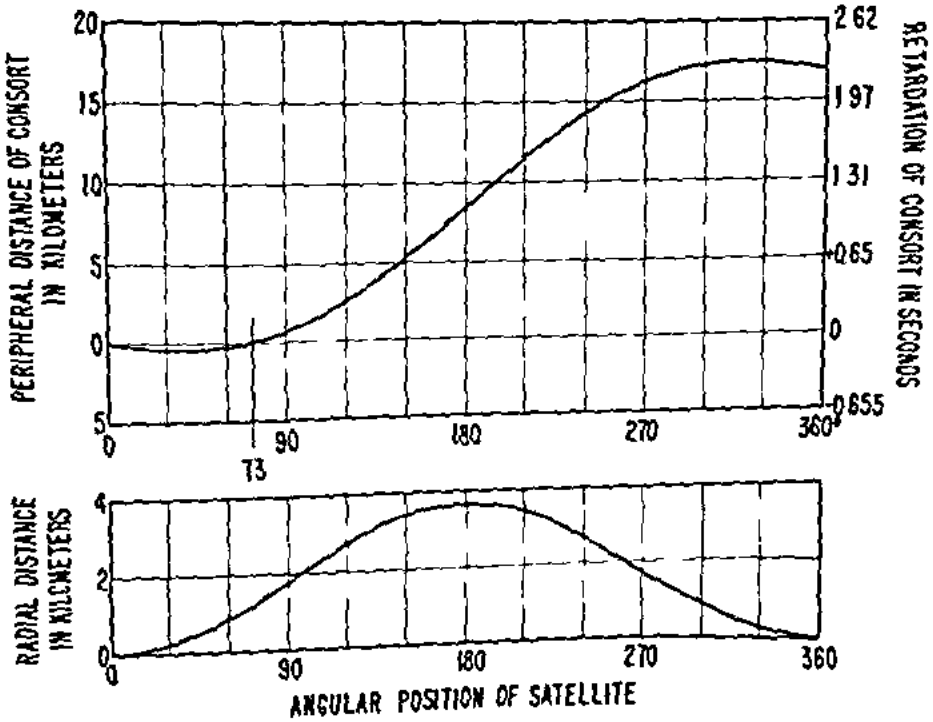


Figure 3 Peripheral and radial distance and time delay of consort thrown forward with 1 m/sec tangential relative speed

launching As a consequence the consort continues to swing out farther and to lose speed

Two characteristic phases with regard to consort position and motion relative to the satellite are of special interest First there will be a certain angular position of the consort at which its speed becomes equal to that of the satellite At that position however the consort will have traveled a larger angular distance from the launching point than the satellite since its speed up to that point has always been larger As the consorts speed beyond this point of equal velocity continues to decrea e another angular position must soon be reached at which the consort will have lost the entire gain of angular position and is overtaken by the satellite The mathematical analysis reveals the interesting fact that the angular distances of these two points from the launching point are independent of Δv as long as this latter magnitude remains small as compared to v This is due to the fact that for a larger Δv the consort swings out farther and as a con equence uffers a corre pondingly larger rate of change of velocity which fully balances the higher speed of angular motion In other words the point of equal speed and the point of passing have fixed angular positions that do not change whatever initial speed of the consort is cho en The point of equal speed is reached at 60 and the points of passing at 7 from zero position (launching point)

Figure 3 shows the relationship for a value of $\Delta v = 1$ m/ ec The ordinates in both graphs are directly and linearly proportional to Δv Therefore ordinate values for any other con ort launching speed may be directly obtained by multiplying the ordinate value of figure 3 by the corre ponding fra tion or multiple of 1 m/sec

The particular problem from which the pre ent discussion started specified a peri heral distance of 2 km after 360 of satellite travel Since $\Delta v = 1$ m/sec produces a distance of 17 km after one revolution as een from figure 3 the forward speed required to reduce this value to 2 km is $\frac{1}{17}$ of 1 m/ ec or 11 8 cm/ ec This is a very small initial velocity indee l for throwing an object 2 km back Of course it takes a complete revolution and a time span of 94 minutes and 1 seconds to accompli h it

It is of special intere t to describe the con ort position during its travel in terms of the satellit as a reference system If this is done for the nontumbling case of motion as depicted in the left hand part of figure 1 it simplifies the analysis if a man is visualized standing on the tellite with his head pointing radially outward (upward in figure 1) in the laun hing moment at 0 If the man always main tain thi position he will see the consort moving forward in the dire ti n of flight of the satellite imme iately after launching The

exact geometric analysis the result of which is shown in figure 4 reveals that the radial and the forward component of consort motion exactly cancel the change of angular position of the satellite toward the radius vector of the main orbit Therefore the apparent motion of the consort, as seen by the man on the satellite will be rectilinear and forward at constant speed In other words for the satellite as reference system, Newton's Lex I seems rigorously fulfilled This state of affairs, however, prevails only for a limited time After about 5 minutes, the observer on the satellite will notice (fig 5) that the consort starts rising until it reaches an elevation of about 17 above the 'horizon (the projected horizontal plane of the ship) Then, it will drop, cross the horizon, pass through the nadir come up behind the ship, and will continue this spiraling motion in an ever widening trajectory until it finally disappears behind the earth The consort will then remain invisible for some time and finally appear from behind the earth on the opposite side of where it disappeared, this time engaged in a narrowing spiral down toward the satellite until it hits it or scores a near miss

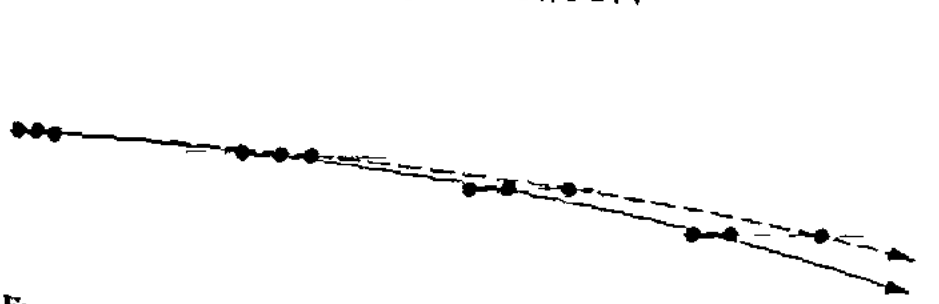


Figure 4 Initial phase of tangentially flown following apparent straight line motion of consort as seen from satellite

It is seen that the observer on the space platform is confronted with a very strange type of kinematics indeed For him Newton s Lex I is valid only for the first 5 minutes after the onset of any free motion Thereafter the rectilinear metric of space appears to change into a curvilinear one of spiral character It is interesting to notice that for a larger or smaller launching velocity the initial phase within which rectilinearity of free motion is preserved changes only with regard to the spatial parameters but not with regard to time The characteristic time interval always remains for the special orbital parameters under investigation minutes For higher launching speeds rectilinearity simply extends over larger distances and for lower speeds correspondingly over shorter ones

240
220
200
180
160
140
130
120
110
100
90
80
70
60
50 min
40 min
0
10
20
30
40
Kilometer
600
400
200
0
2
4
6
8
10
15
20
min
200
400
600
800
1000
1200
1400
Meter
15
1
5
0
10 min
20 min
30 min
1
5
15
2
25
3
35
Kilometer

A general theoretical analysis of the phenomenon of apparent mutual rectilinear motion is beyond the scope of this discourse Yet it should be mentioned that the phenomenon exists only in systems in which both the orbit of the satellite and of the consort are exclusively determined by the central gravitational field of the planet which they circle As soon as the mutual attraction of satellite and consort exerts a noticeable influence on the orbits, the apparent rectilinear motion becomes disturbed How well the condition of the central gravitational field as the sole orbit determining force is fulfilled for an earth circling satellite at 500 km height can be seen from a comparison of the respective field strengths on the surface of the satellite

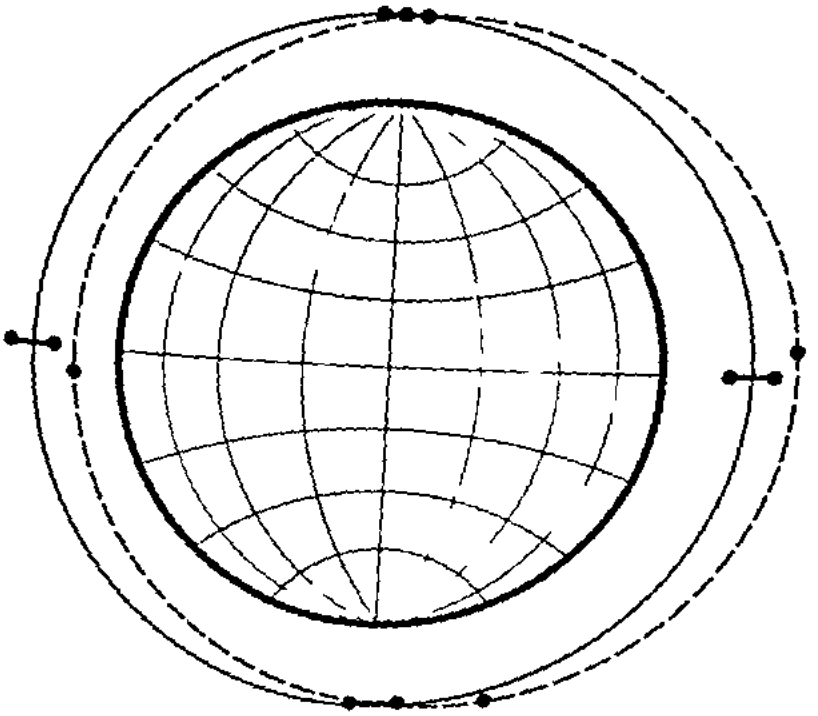


Figure 6 Consultofa fall upwa l th w

Assuming spherical shape a weight of 100 metric tons and a mean density of 1 0 one obtains a gravitational force on the surface of the satellite of 8×10 G produced by the mass of the satellite itself where as the earth s field at the same location amounts to 0 8f G Thus is a ratio of forces of 1 to 10 million For any other point inside or outside the satellite this ratio becomes even larger As the other extreme the conditions on the surface of the moon could be visualized There the moon s attraction produces a field trength of 1/6G and the earth s field equals $2\,7\cdot\times10$ G Consequently the trajectories of thrown or freely falling objects on the moon are exclusively determined by the

moon s own gravitational field contrary to the situation on an earth circling satellite where the earth s field is the sole directing force

As was stated previously two limiting cases stand out among the infinite number of ways of throwing an object from one satellite to another 2 km back The analysis of the first was given above The second will be described now Figure 6 depicts the basic geometry The consort is launched vertically upward in terms of the reference system of the observer on the platform or radially outward in terms of the orbit Δv the launching speed now forms a right angle with the orbital motion of the satellite and therefore has to be added vectorially to it Evidently, the angular speed of the consort does not change at least not during the first infinitesimal time interval after launching However the consort does change its radial distance from the earth from the very first moment As a consequence its circular orbit changes into an elliptic one This in turn causes a decrease of orbital speed according to Kepler Second Law which states that the radius vector sweeps equal areas in equal times The consort thus is seen to fall back after launching in angular position behind the satellite This goes on for 90 of travel until the apogee is reached At that point the consort travels at minimum speed and reverses its radial motion It now begins to fall back toward the earth thereby gaining speed and making up for the loss of speed suffered in the first quarter At 180 the consort s angular speed has become equal to that of the satellite However the consort reaches this position later than the satellite since its speed during the full first half of orbit has all the time been smaller The radial distance from the earth at 180 will be equal to that of the satellite both orbits intersect at that point Yet both bodies will not pass through that position at the same time as has just been stated If the correct launching speed was chosen the desired distance of 9 km will be accomplished at the 180 point The vertically upward throw thus is seen to fulfill the task of throwing an object back 2 km in half the time and length of travel than the forward throw

The consort motion in the second half of the revolution is the exact counterpart of the first half The radial distance and corresponding speed at any angle 180 $+\varphi$ are identical to the ones at 180 $-\varphi$ whereas the rate of change of these magnitudes has the opposite sign At 360 conditions identical to those existing at the moment of launching are restored This latter fact stands in contradistinction to the

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1 The angular position of the radius vector measured from the initial position $\varphi = 0$

forward throw which was shown above to lead to a progressive change of the mutual positions of consort and satellite from revolution to revolution For this earlier case, a restoring of the original parameters can occur only after many revolutions and only for certain singular values of the launching speed that produce integer multiples in the periodicity For the upward throw a strict one revolution periodicity exists and holds for any arbitrarily chosen launching speed

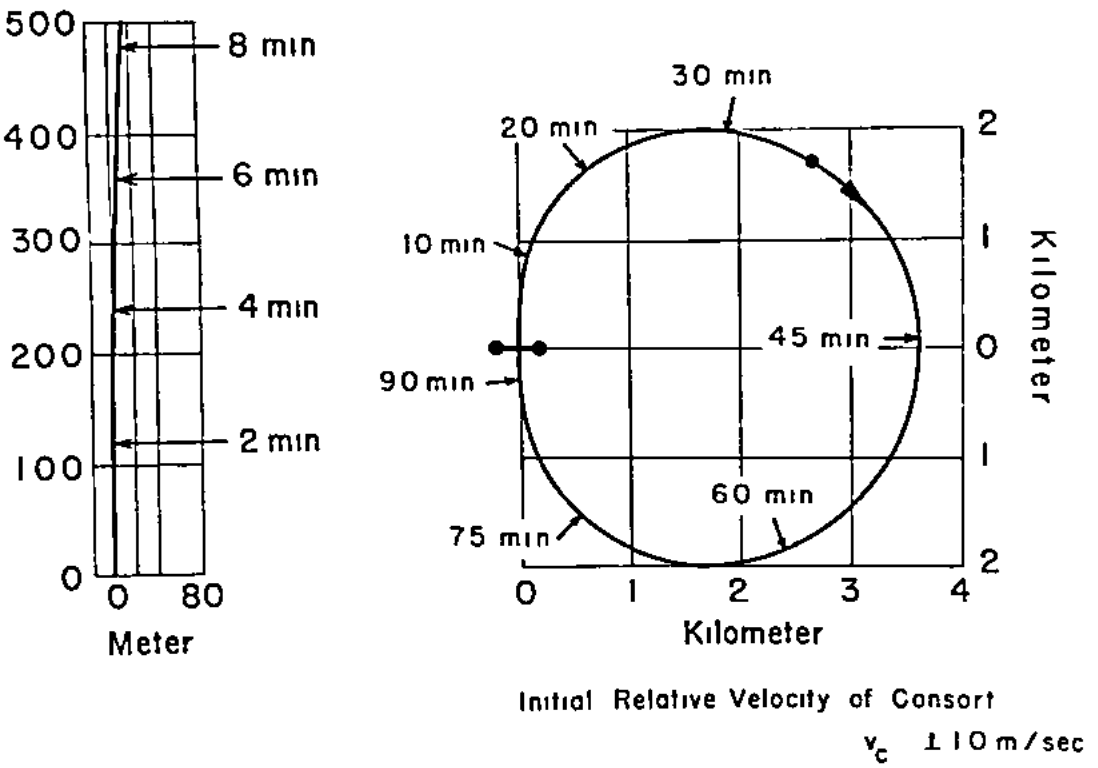


Figure 7 Complete orbit of consort for upward throw of 1 m/sec as seen from satellite

In view of this basic difference of the two cases, it is intriguing to investigate for the vertical throw, the apparent motion of the consort in terms of the observer on the satellite as reference system (fig 7) Again the consort maintains apparent rectilinear motion at constant speed for the first 5 minutes after launching This is especially remarkable inasmuch as in this case the motion is carried out in radial direction, that is against the gravity attraction of the earth As can be read from figure 7 a consort launching speed of 1 m/sec leads to a distance of 3 6 km at the intersect of the two orbits at 180 If a distance of 2 km is desired as specified in the original problem a launching speed of 2/3 6 x 1 m/sec=0 56 m/sec would be correct

As has been pointed out before, the radial and tangential launch

ing directions are the limiting cases of a full continuum of possible angles The analysis of this general case in which the launching speed has a tangential and a radial component is more complex and shall not be carried out in full here An attempt to indicate the properties of the consort orbit is made in figure 8 The angle between launching point and perigee can now assume any value between 0 and 90 depending on the launching angle The angles however are not equal but connected by a more complicated relationship Similarly the angular distance to be traveled and the corresponding time can assume any value between 180 and 360 or half and full revolving time respectively

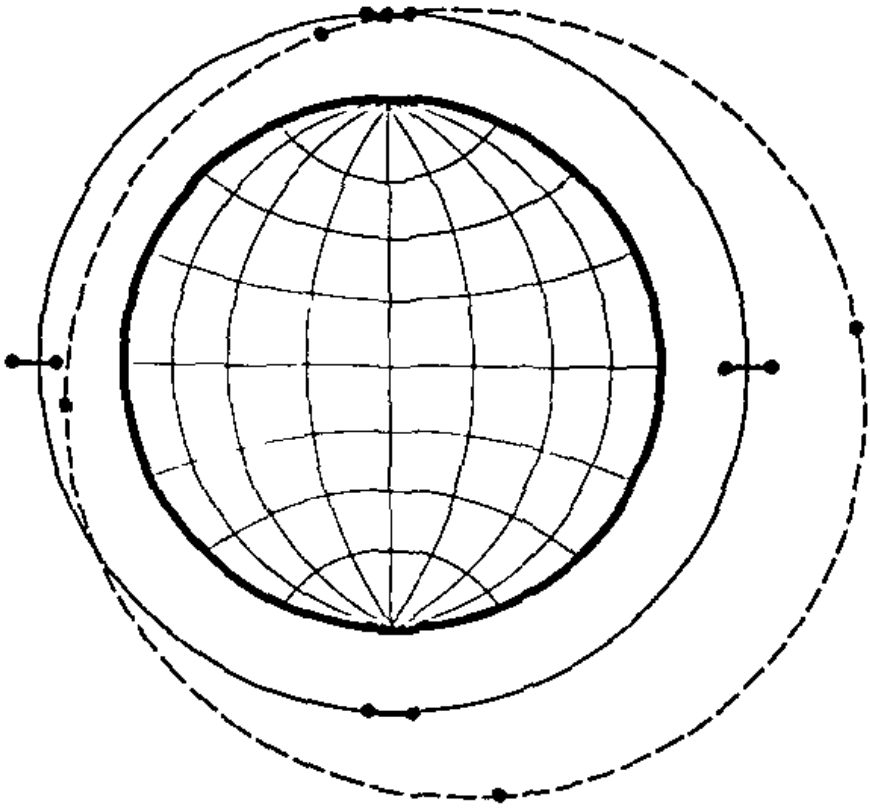


Fig 8 Consort orbit for launching from lower flow

Finally it should be mentioned that besides this just discussed range of 90 of possible launching angles other allowed launching directions exist for accomplishing the task The resulting transfer ellipses even achieve the goal over angular distances of less than 180 and in correspondingly shorter times The required launching speed however increase considerably and so does the relative speed of arrival at the second ship The most extreme case in this respect is the backward throw directly toward the second ship Required

launching speed in this case equals *full orbital speed*, the consort arrives at the second satellite with the same relative speed, somewhat over 7 km/sec It certainly could no longer be caught by hand

CONCLUSIONS

It will be left to the imagination of the reader to embellish the various aspects for the life of a man or a crew on a space platform Only one particular consequence will be mentioned it is impossible to place a loose assembly of parts or objects of any kind in orbit and ensure their staying together in the original array Even if the initial relative speeds of such objects toward each other are absolutely *zero*, the fact that their respective centers of gravity will have slightly different distances from the center of the earth inevitably assigns them different orbital parameters As a consequence such an assembly will start spreading immediately after it has been set free, and, though certain positional periodicities might occur the complete original array never will be restored On the other hand, it requires only minute binding forces to tie such *objects together* in a way that they act as one body with one center of gravity Here again, the small muscular power of man, or a *string* of only grams of tensile breaking strength, can control objects of tons of inertial mass.

SUMMARY

In an orbiting satellite of finite size the completely gravity free state that is, *full balance of centrifugal* and gravitational forces is realized only in the center of gravity of the vehicle At points radially inward or outward of this center small gravitational forces are felt They are of the order of 10^{-6} G and therefore entirely negligible as far as physiologic and sensory effects on man are concerned They are not negligible however as soon as free motions of objects on a time scale of several minutes are involved

Through the use of a concrete example of intersatellite transportation the dynamics and kinetics of such motions are analyzed in a simplified way Two limiting cases the "forward and the 'upward' throw of an object from the satellite are analyzed in more detail

A consequence of more general interest of these relationships is the known fact that it is not possible to put a loose assembly of parts or objects in orbit so that they maintain their original array As their respective centers of gravity will have slightly different distances from the center of the earth they will start spreading as soon as they are set free On the other side only very small conservative forces are required to keep even very heavy objects aligned

Development and Use of Medical Machine Record Cards in Astronaut Selection

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W RANDOLPH LOVELACE II M D

IN EARLY 1958 the Lovelace Foundation undertook the development of a method of recording on machine record cards detailed medical information for the U S Air Force Man in Space program It was believed that an effort should be made to record these medical data in such a manner that easy recall and rapid retrieval of the information would be possible It was thought that this could facilitate the selection of astronaut candidates and in a larger sense possibly indicate better ways of medical data recording and handling It should be noted that the Man in Space program was later given to the National Aeronautics and Space Administration This method of data recording and handling was selected for use in connection with their astronaut selection program because of the ease with which this information could be used in the future

It was planned to survey the various International Business Machines Corporation medical data recording programs which were assumed to be in use This was to be followed by a process of adapting appropriate portions of these to the specific needs of the Man in Space medical data recording and processing problem However contrary to all assumptions and expectations it was soon discovered that there had apparently been very little actual recording of medical data as such on machine record cards and none in any great detail such as this project would require

Woolbury has emphasized that all the life sciences have the following in common Something is observed something is selected for

From the Lovelace Foundation for Medical Education and Research Albuquerque New Mexico This work was supported by a contract with the U S Air Force Research and Development Command Presented at the Tenth Anniversary Meeting of the AGARD Aerospace Medical Panel Paris France 6 September 1959

recording (sampled) something is recorded in some form or other (coded) something is done to it (analysis) or it is put away for further use (stored) and in most cases used later (retrieval) A major reason for slow utilization of revolutionary improvements in data handling in the life sciences has been lack of personnel familiar with the use of such equipment and with what type of processing is appropriate once the computer stage is reached

The use of machine record cards for recording medical data for examinations or on patients represents a radical departure from the handwritten medical record which has long been traditional in the medical profession For many years there have been innumerable complaints about handwritten records Three of the more serious shortcomings of this method of recording are It is much too time consuming the records are often at least partly indecipherable and the retrieval of information is both laborious and time consuming to the point that much needed clinical research is impractical In all probability there is no panacea to this problem It is recognized moreover that individuals cling tenaciously to the traditional methods that have been taught them This is partly because a good deal of effort is expended at least temporarily in making changes Yet it is clear that sooner or later something will have to be done to systematize medical records Perhaps the logical place to start is in the medical schools

The study and development described below suggest a direction in medical recording in which further effort appears warranted In a larger sense much data recording in the broad field of life sciences is susceptible to this treatment which renders modern data processing and computer use feasible This study was undertaken here for the specific purpose of the Man in Space or astronaut selection program At the same time it was thought that such a systematic approach to medical recording should also be compatible with future general clinical and hospital use perhaps in the Air Force Medical Service as well as in civilian medicine In addition consideration was given to the possible future use of medical machine record cards with special medically programmed computers as diagnostic aids for problem cases This is mentioned because data to be used in a computer must be in readily retrievable form such as machine record cards or tape Machine record card data may be recorded on tape automatically

Of interest to medical administrators in clinics or groups with fixed charges for various clinical tests and procedures is the possibility of rapidly and automatically computing itemized charges by processing a deck of punched cards on a discharged patient through a business

machine Various statistical records can be compiled at the same time

Over the past several years there have been individual efforts by physicians and groups to adapt modern machine methods for records and data processing and handling now widely used in business to the various fields in medicine Perhaps most notable of these has been the use of machine record or IBM card in the medical indexing of patients by diagnosis Such procedures have greatly facilitated medical research by making possible the quick accurate and easy recall of record by diagnosis and the selection of appropriate cases for study This has reached a high state of development at the Mayo Foundation and Clinic under Dr Joseph Berkson and at the M D Anderson Hospital and Tumor Institute Houston Texas under Dr R Lee Clark Jr and Miss Eleanor McDonald the director for biometrics and records Several additional clinics and groups have also developed various other applications of the modern business machines to their administrative efforts with reported savings in personnel and costs

Dr Logan Robertson of Asheville North Carolina as far as can be learned has made the first concerted effort to use machine record cards in actually recording medical data in practice He designed cards to record on a considerable scale the medical history physical examination and laboratory data on patients He also made early use of the IBM mark sense card approach for recording such medical information Excellent material and advanced methods have been developed under his auspices during the past 6 or more years His technics were particularly adapted to an industrial medical service but could also be used with some modification in the usual practice of medicine

MACHINE RECORD CARD RECORDING OF MEDICAL DATA

Coded Work Sheet and Card Punch Operators

It became clear in considering the problem of possible ways of recording medical information that either one of two general methods might prove suitable

The first method involves developing a work sheet upon which the desired information is noted by the examining physician or a technician according to a prearranged code suitable for machine record card recording This information is then recorded on standard machine record cards by card punch operators who have been especially trained to accomplish this procedure from such a work sheet This system has a number of advantages in that it is simple and straightforward in its approach once it has been developed and is understood by all concerned A maximum of information is stored on

each machine record card so produced This can be of economic importance when the storage problem is considered It tends however to require the ready availability of trained IBM card punch operators together with certain equipment even for a small operation

Sample work sheets showing this approach had been developed in connection with a proposed Care of Flyer program under the auspices of Captain Ashton Graybiel MC USN director of research of the U S Naval School of Aviation Medicine Naval Air Station Pensacola Florida[2] They were kindly sent to one of us (A H S) by Dr Graybiel in August 1958 Two of several of his medical work sheets are shown in figures 1 and 2 Figure 1 is a part of the history which will go on one machine record card and figure 2 is a part of the physical examination which will also go on one card Some of his ideas were helpful in developing the master card for the present program which requires a punch card operation

The card punch operator uses these work sheets as the source of data The usual card punch operation is carried through and regular machine record cards are produced The cards are then verified by the standard methods familiar to all who have experience with this common form of data gathering and processing These methods are described in detail in IBM publications and need no further discussion here

The disadvantage of this system is that the machine record card with this coded information punched in has no meaning to a physician who may wish to obtain data directly from the card unless he is extremely familiar with the codes used and has had considerable experience in the use of the particular cards For this purpose either work sheets must be retained for reference or special so-called read-out equipment must be available This is not necessarily an insurmountable objection inasmuch as an examination form or other medical forms can automatically be printed from such data if the volume warrants the cost In some applications easy read out of information is not vital as for example when the cards are used subsequently only for various correlation and statistical studies that rely entirely on machine operations Further development of this approach for recording physical examination data and for other general clinical use seems indicated It has many possible use also in recording data in the life sciences

Mark Sense Type Cards and Automatic Processing

The second major approach at this time for recording information on machine record or IBM cards is the use of the mark sense method

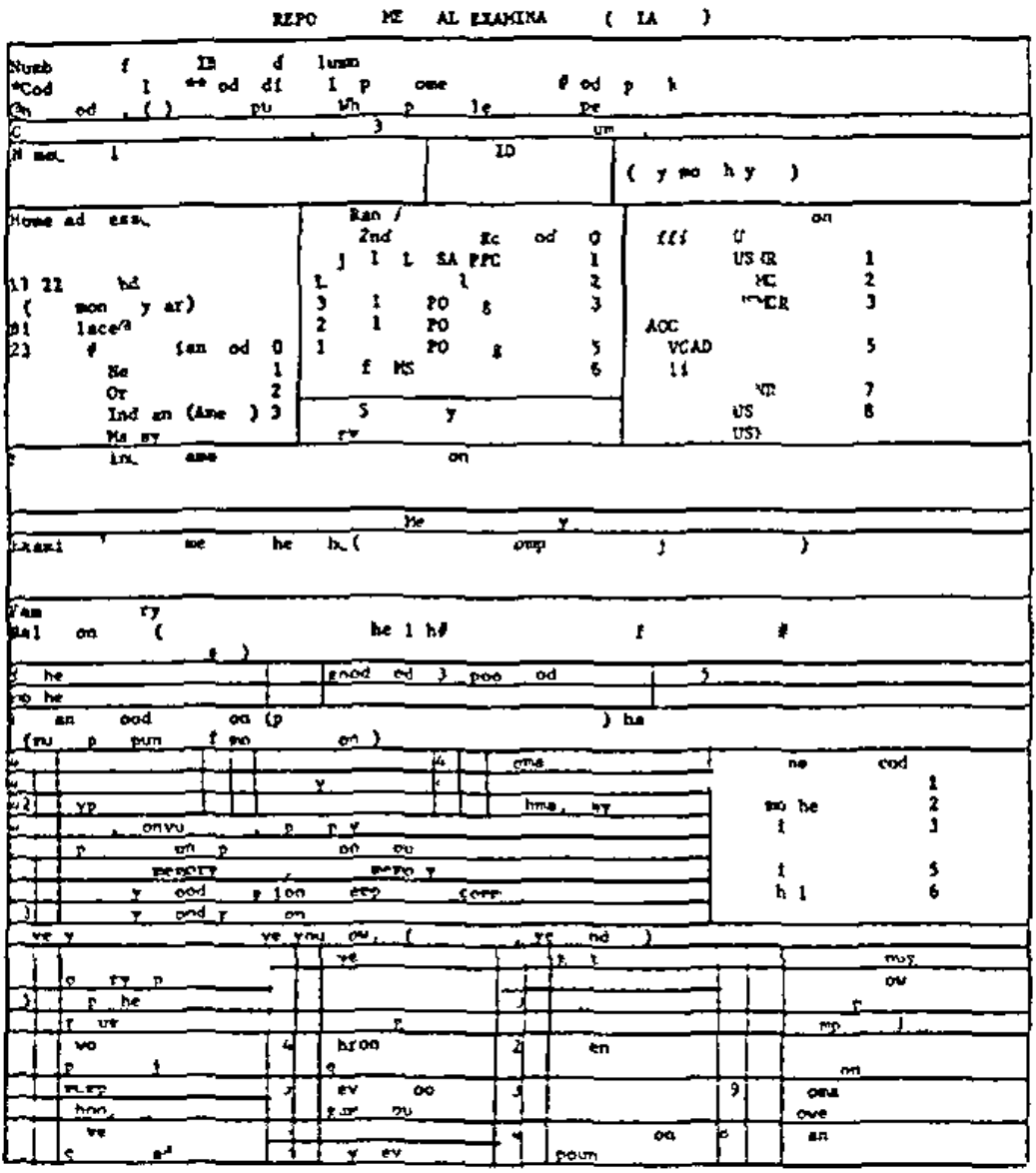


Fig 1 Medical history worksheet on which selected items have been coded from initial computer interpretation (Courtesy Captain Alton C. Eyblin, MC, USN, U.S. Naval School of Aviation Medicine, Pensacola, Fla.)

Cards of this type were developed at the Lovelace Foundation. In its simplest form these cards are designed with questions written out to which answers are made by placing a short pencil line using a special electrographic pencil in a nearby space provided for Yes or No. These spaces are called race tracks because of their shape and are placed in a rather random fashion on the cards so as to take maximum advantage of the available space. An example of the type of cards developed here is shown in Figure 3. This is one of 9 medical history cards which

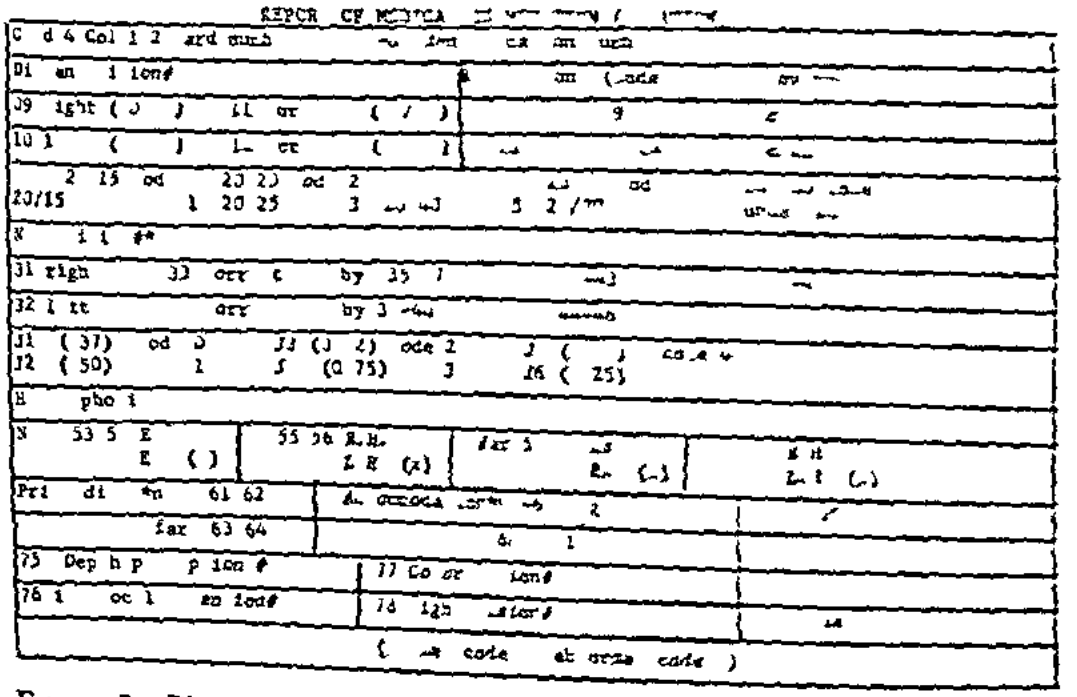


Figure 2 Physical examination work sheet, one of several work sheets coded for machine record card punch operation (Courtesy Captain Ashton Graybiel MC USN U S Naval School of Aviation Medicine Pensacola Florida)

have been marked by an examinee It may be pointed out that these mark sense cards may also serve as the work sheets for standard machine record cards if a code for this is developed for use by the punch card operation However this would appear to be some duplication of effort

The upper horizontal line or row is actually lightly shaded on the cards but does not show on the reproduction It is reserved for staff use The medical history or similar questions may be answered either by the patient alone or more commonly with the assistance of a nurse or medical technician or the patient may be asked the questions in the usual way and the answers marked in the proper spaces by the physician In the latter case to save time it is necessary for the physician to mark only the positive findings The negative finding marks may be filled in later by a secretary so that if proper the card is to be done the machine will not later reject the card for the apparent lack of consideration of the other questions

In any case as he reviews the history the physician indicates by his mark in the proper race track of the upper shaded horizontal line or row whether he considers that the history of each system is or is not of significance Marks in this upper row thus indicate that a physician has reviewed the history He can initial the card or sign his

Fig 3 Ver t l l t ry (l f 9 nl) Can be filled t ly p tl nt w tl t n f n rse It i wed by phy l i n nl n ll tel in b ied re

name on the bottom in ink for authentication purposes Also if he or the patient wishes to add explanatory comments they may be written in ink on the reverse of the card To save time there is a race track at the upper right hand corner of each card which when marked indicates that there are remarks on the reverse side of the card

A portion of the medical history so recorded by the patient on the card is shown in figure 3 The positive findings indicate that he has had food intolerances appendicitis abdominal distention jaundice an abdominal operation (which refers to the appendectomy) diarrhea constipation hemorrhoids and fungus infection Specific negative findings are also of importance

Marks in the upper shaded row on the card shown in figure 3 indicate that a physician has reviewed the card and considers that there are significant gastrointestinal problems that there are no significant skin problems and that there are additional comments on the back of the card as indicated by the mark in the upper right hand corner These remarks must be either typed or hand copied on duplicate cards if they are made as there is no method at present for otherwise reproducing them It was of interest in the astronaut examination that there were fewer additional remarks that were believed vital recorded on the back of the cards than had been anticipated It is considered improbable that a deck of cards describing a patient or examinee other than in the most general terms can be devised in which no additional notations will be indicated When the information on the face of the card is less complete the amount of comment may increase though this will depend in part on the purpose and completeness of the examination In all probability a balance will have to be struck in devising sets or decks of machine record cards for at least two or three different levels of detail for different medical applications It is relatively easy to design cards to record data in any special field of interest

Figure 4 shows how numerical data are recorded on mark sensed machine record cards using a laboratory card as an example This card indicates that the patient had 15.8 grams of hemoglobin per 100 ml a hematocrit of 46 ml per 100 ml a sedimentation rate of 5 mm white blood corpuscle count of 7 000 per cu mm with a differential count of 59% segmented forms 3% eosinophil 11% lymphocytes and 2% monocytes There were 350 000 platelets [illegible] is O Rh negative with negative C D E and DI [illegible] logic test done by the Venereal Disease Research Laboratory method [3] is nonreactive There are also comments [illegible] of this card as indicated by the mark in the [illegible]

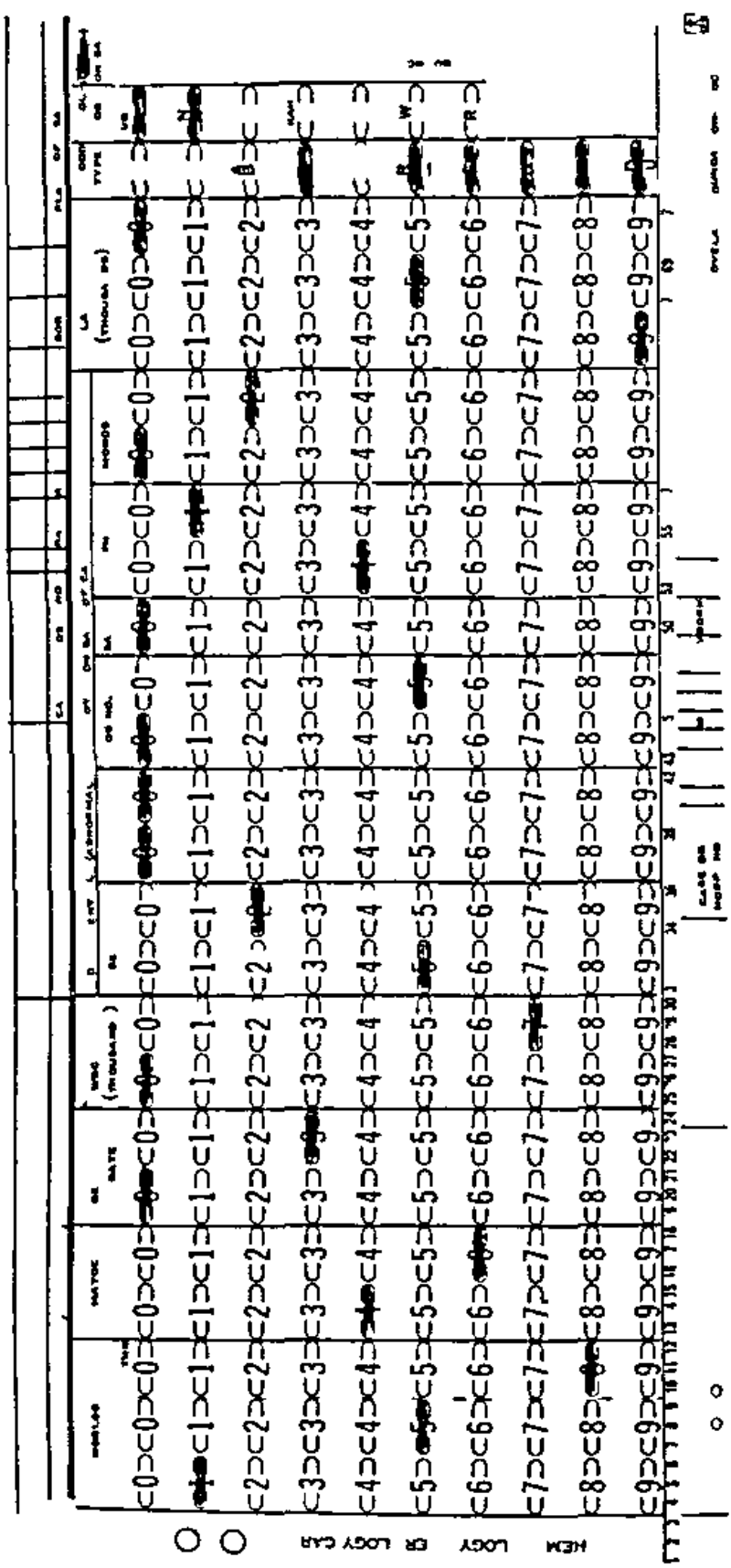


Figure 1. Laboratory test (1 of 7 pl.) Oil cards for gross urinalysis and blood chemistry

track. In this case the examiner indicates that there is no pharyngeal reflex is apparent, quite a common finding in those with more advanced experience. If certain tests are not done, the appropriate field is blank.

Figure 5 shows recording of numerical data on an audiation background and the explanatory.

Figure 6 is an example of the physical examination card. The positive findings are hearing loss, septal deviation, evidence of a tonsillectomy, an abnormal larynx and hemorrhoids. The examination is otherwise normal in all respects. This card is more crowded than would be desirable. Experience may indicate that the information is split and should be placed on 2 cards. Again there are coded punches on the back of the card which indicate the amount and direction of septal deviation together with the amount of hearing loss, location and description of the laryngeal abnormality and the hemorrhoids. The extent of the hearing loss together with all other audiology information is noted on special audiology cards.

Figure 7 is an example of one of a number of special examination cards. This is the cardiology card and is used to describe the electrocardiographic findings in a systematic manner. This has been found desirable for everyday use in our cardiology clinic for all EKG recordings and should later prove useful for further studies.

Machine record cards have also been developed for the specialists examinations in the fields noted below. After limited experience it became clear they should be revised in such a way that they could be used by them selves in the specialist's routine clinic practice. This causes some duplication in the history such as in eye, ear, nose and throat but is believed balanced by the greater usability. The second generation of machine record cards reflects this change.

It is possible of course to have both types of information for example *Yes No* and numerical data on the same card.

As personnel become familiar with the use of machine record cards many short cuts may be taken to increase the amount of meaningful information which can be included on each card. Also as experience increases in their design and use better ways of asking questions evolve together with increasing selectivity in the questions themselves. Color coding of the cards for different sections makes them easier. There are many color combinations, both solid colored cards and colored stripes which enhance the ease of identification. Further advances are doubtless also possible in machine record card handling equipment. The main advantage of the mark sense card approach is that anyone can readily interpret what is recorded once the simple mechanics of the method are explained.

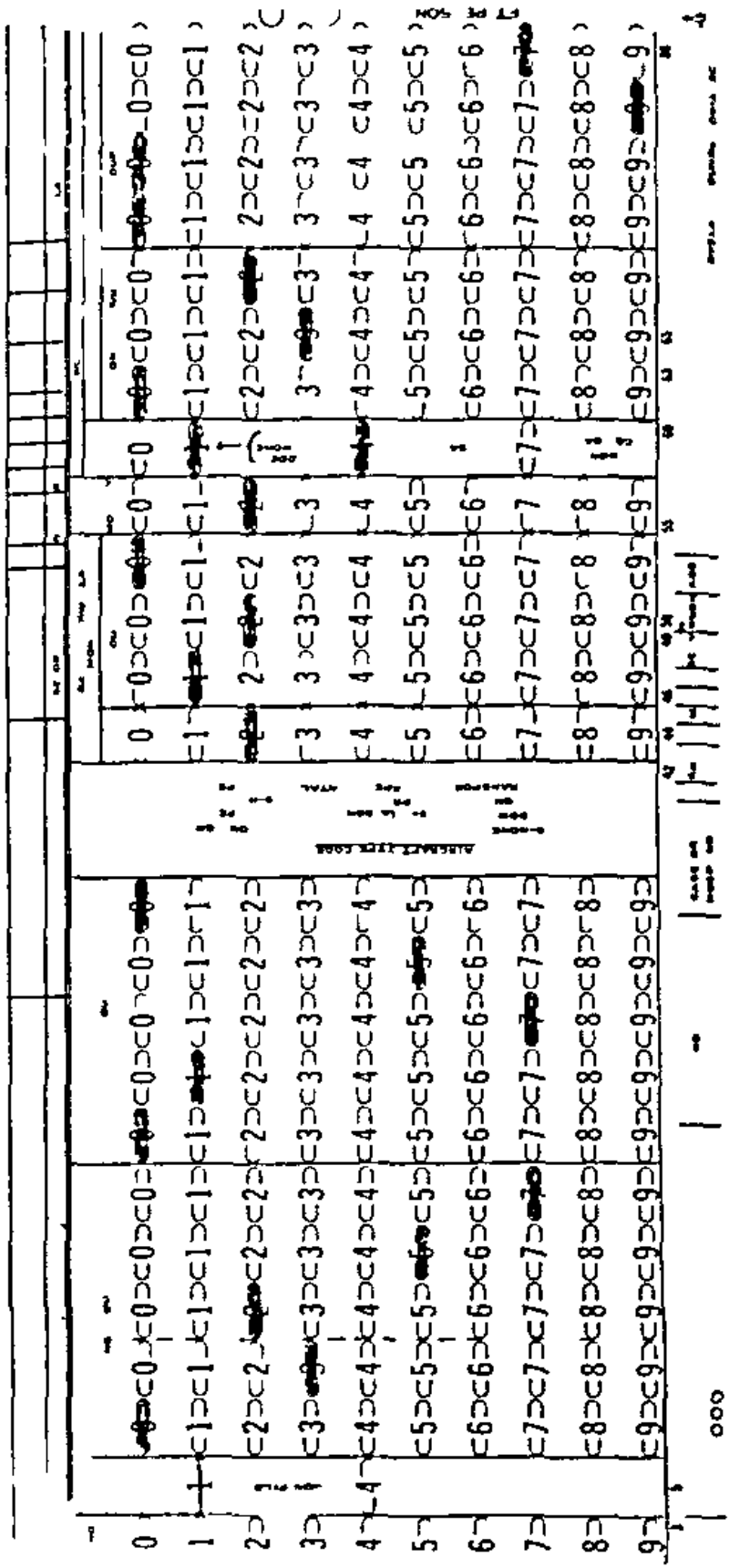


Figure 1 kgrou nd (1 of 6 1) 1no 11 11 ntl l inf tl n n th p tl nt flying pe i nce

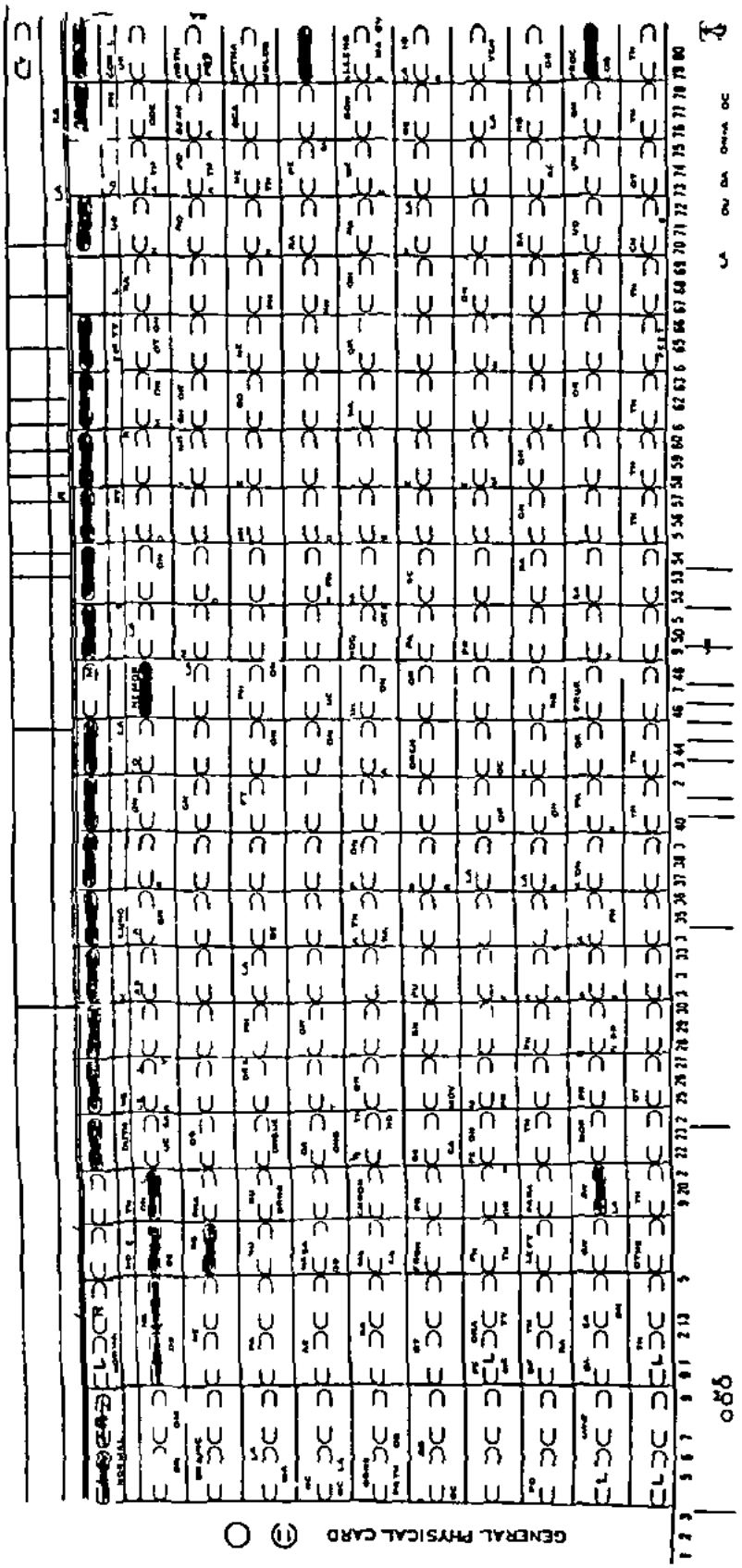


Figure 6 General physical (1 of 2 cards) Filled in by physician

Fig re Speci l n in ti n (1 of 17 and) Thi lectror rdi gr n nl l represent ti of oth re on ophtl lmology y ll l gy l nt l phy l co pet t t

Even with minimum experience one is able to scan these cards very rapidly to obtain the important positive and negative information contained thereon

These mark sense cards may be punched immediately or not as desired As contrasted with the work sheet approach using IBM card punch operators these cards are punched automatically by machines As the card passes through the machine tiny metal brushes pass over the surface of the card making electrical contact through the electrographic pencil mark This electrical contact causes a hole to be automatically punched just below the race track Thus no card punch operators are necessary If marking errors are made on the cards prior to punching the pencil lines within the race tracks may be erased and replaced elsewhere as indicated However by either approach if errors are discovered after the cards are punched the card must be replaced with a corrected one in all instances Once the cards are punched duplicates can be made very easily

There are several disadvantages of mark sense cards

1 The pencil marks must be made with reasonable care and accuracy in the appropriate race track otherwise if the card are to be punched or duplicated the automatic punching machine may make errors This can be a serious draw back just as is carele sness wherever it is encountered in medical recording A small amount of instruction of the medical staff and experience in the u e of machine record cards reduce the e relatively minor difficulties Machine record cards of all kinds should be handled with care to avoid bending and mutilation

2 Considerably le information can be placed upon each mark en e card as compared with the standard IBM card thereby proportionall increa ing the storage problem Information on the e cards can be transferred to magnetic tapes automatically with g eat savin in storage pace If one has p oper equipment very rapid recall of informat on is possible This opens up entirely new possibilities for medical record handl ng for large operations such as n urance companies Depending upon the layout of th cards the skill w th which the questions are asked or the number of d gits to be u ed in reco ding numerical data it is e t mated that only about one-fou th to perhaps at most one-half as much nformation can be reco ded b the mark en e method on each card as by the usual coded IBM card method u ing work heets and punch card operators

One approach or the other may be favored depending upon per onal preferences specific requirements and the size and type of medical operation being considered If easy read-out is desired with out equipment the use of mark sense cards appears the more attractive This seems to be the case in ordinary clinical use If storage is a problem and easy read-out is not an overriding consideration the work sheets and standard IBM cards have some advantages The work sheets may of course al o be used as the clinical record cards being punched later This entails some duplication but less than does

typing the written clinical record as is now frequently done If both are stored this again increases the storage problem

After weighing the advantages and disadvantages of one general approach against the other it was decided that the mark sense approach would be the more useful for the astronaut selection program and possible subsequent clinical use as well even with the known disadvantages

The main reasons which favored the decision to use mark sense cards were as follows

1 The very great advantage of being able to make easily appropriate direct machine processing of the data without the necessity of retyping the data from the written record

2 They are the least likely of any system which requires handling of the cards to damage the cards to the point that they cannot be read by the machine

3 Corrections to the data can be made with a pencil and eraser

4 Additional notes or remarks may be written on the back of the card or on the face of the card in the space provided for this purpose

5 The cards appeared to be most adaptable to clerical processing in the offices both at the Aerospace Medical Laboratory and at the Air Force Missile Development Center *where the cards may be sent and processed by clerical personnel* The cards may be sent directly from the data collection point to the Wright Patterson AFB Ohio for the first step of processing which is machine verification

6 The system is adjacent to the existing office automation and data processing system at the Air Force Missile Development Center which will be used for the processing The cards may be sent directly from the Wright Patterson AFB Ohio to the Air Force Missile Development Center for machine processing

7 Duplicate cards may be made from the original cards by machine processing

8 Finally it seemed that they would be the most acceptable to the astronaut candidates and to the medical personnel who would be responsible for the collection of the data

Despite the many advantages of the mark sense approach there are certain disadvantages which must be recognized and which must be overcome in order to make the system work satisfactorily The most important of these disadvantages are the following

1 Special equipment must be designed and purchased for the collection of the data

2 Special equipment must be designed and purchased for the machine processing of the data

3 Special programs must be written for the machine processing of the data

4 Special equipment must be designed and purchased for the storage of the data

5 Special programs must be written for the retrieval of the data

6 Special equipment must be designed and purchased for the duplication of the data

7 Special programs must be written for the duplication of the data

8 Special equipment must be designed and purchased for the machine verification of the data

9 Special programs must be written for the machine verification of the data

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possible that for very difficult diagnostic problems a physician could some day fill in such a deck of the machine record cards with all the information available on his patient and send them to a medical center with a specially programmed computer offering this service Knowledge of the several most probable diagnoses in order of their probability would provide guidance for further diagnostic work to narrow down still further the various possibilities The task of programming such a special purpose computer and keeping it current with new medical knowledge could possibly become a future function of the National Medical Library Such utilization of machine record cards and memory devices would require the development of more broadly acceptable standardization of medical terms It is believed that many new and as yet undreamed-of developments which will aid the physician or scientist can stem from better medical data recording and handling techniques The advantages of the application of modern data processing cannot be fully known until after some years of use and development

DEVELOPMENT OF CARDS FOR THE ASTRONAUT SELECTION PROGRAM

The decision to use mark sense cards having been made it followed that a deck of machine record cards would have to be developed for the astronaut selection program All the medical and other data that was believed meaningful or that could possibly prove meaningful in the future would have to be included This meant a maximal rather than a minimal amount of information would have to be recorded It was recognized in the beginning that medical information which would prove meaningful for future astronaut selection could be finally determined only on the basis of experience with individuals in high altitude high performance aircraft and more particularly after actual space flight To some extent also such information will be meaningful in the light of the specific data one has on hand concerning the first test group With experience it should be possible in the future to reduce the amount of information now being collected for this initial selection program to what will prove most useful later On the other hand it is probable also that some of this may be replaced by other needed data not recognized now as important Subsequent generations of machine record cards will reflect these changes

For ordinary clinical or office use a deck of machine record cards with only a limited detail would be indicated and could be developed easily However for possible future use with a computer detail at least comparable to that for the development would appear indicated because as the number of bits of information increases the accuracy of diagnosis tend to improve

The various steps involved in devising machine record cards for this purpose proved to be not extremely difficult but very time consuming The assistance of many physicians in the several specialites and of

staff members of the Lovelace Foundation and Clinic was employed to the utmost to insure that the important aspects of their respective fields were covered by the data on the machine record cards In addition the standard texts on medical history taking and physical examinations were used Nearly all participants had had experience in the field of aviation medicine

Once the practical problems and fundamentals had been learned the IBM supplies division Form X74–4815 0 entitled IBM Card Layout Form Horizontal Mark Sense was found to be a most useful aid After the card layouts had been designed it was decided to use the photo-offset printing method because of the relatively small number of copies to be printed of each of the first generation of IBM cards Actually 500 of each card were printed It was believed certain that practical use would suggest a number of changes and this proved to be the case It should be emphasized that once machine record cards have been standardized for a given purpose IBM printing plates are made markedly reducing the cost of subsequent printing

It was at this point that the broad experience of Dr Robertson and his staff proved a key factor in the developmental process It is considered doubtful that the project could have been completed in time without their skilled assistance and untiring efforts or without those of the photo-offset printer there who worked closely with the project Dr Robertsons organization constitutes what is believed to be the first IBM Medical Service Bureau in existence

Recently the IBM Corporation has devoted a special section of its research staff to medical applications of modern business machine techniques It is expected that this will prove most helpful for the further development of improved medical recording and data processing for clinical uses as well as broader applications in research in the biologic or life sciences generally

To begin with it was thought that the specific information required for the Man in Space program was quite generally an extension of that now considered necessary in aviation medicine In addition the dynamic physiologic tests to determine the maximum effort that could be safely exerted expressed in terms of several variables were considered most important These are carried out by Dr Ulrich Luft as part of a research program of the Lovelace Foundation It [illegible] also that the stress tests being conducted at Aero [illegible] together with psychiatric and psychologic tests [illegible] data would be necessary Consequently ma[illegible] designed and used to record the results of [illegible]

ASTRONAUT SELECTION

When the National Aeronautics and Space Administration was given responsibility for the Man in Space program and Project Mercury came into being the medical requirements were reconsidered Thus certain medical criteria were established by members of the Special Advisory Committee on Life Sciences to the National Aeronautics and Space Administration meeting together with the representatives of the services at the Langley Research Center Virginia Among these were the Air Force and Navy Schools of Aviation Medicine the Aero Medical Laboratory and the Armed Forces National Research Council committee on bioastronautics Fortunately these requirements were similar to the ones envisioned earlier and were such that the additions could be included with minor alterations in the layouts of machine record cards developed for the Air Force Man in Space program then nearly complete The time elements were such however that the completed cards were received from the printers only a few days before the astronaut candidates arrived

The cards developed are as follows

a Medical personal history 9 cards
b Surgical summary 1 card
c Family history 1 card
d Smoking and alcohol consumption history 1 card
e Aviation history 6 cards
f General physical examination 2 cards
g Exercise response blood pressure and pulse rate 1 card
h Medical specialists examinations
Ophthalmology 6 card
(? of these are similar and record refraction 1 card for each eye)
Otolaryngology 1 card
Audiology 5 cards
Dental 1 card
Cardiology 1 card
Electrodiagnostic procedure Nerve conduction time and neuromuscular conduction studies noted on reverse of physical examination card
Electroencephalography Noted as normal or abnormal Abnormalities described on back of physical examination card
Radiology 2 cards (1 for chest 1 for all other) Here the radiologic diagnostic code developed by A L Grabowski Rochester General Hospital E Forrest Merrill University of Rochester Hospital and Eastman Kodak were used
Roentgenogram were done as follows
Chest PA inspiration PA expiration Rt lateral
Colon Barium enema (high kilovoltage technics used for compression pot film image intensifier used for fluoro copy)
Sinuses Four views for frontal maxillary ethmoid and phenoid sinuses (localized pot view)
Spine lumbosacral AP and lateral (obliques when indicated)
Stomach and esophagus (image intensifier used for fluoro copy)

staff members of the Lovelace Foundation and Clinic was employed to the utmost to insure that the important aspects of their respective fields were covered by the data on the machine record cards In addition the standard texts on medical history taking and physical examinations were used Nearly all participants had had experience in the field of aviation medicine

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To begin with it was thought that the specific information required for the Man in Space program was quite generally an extension of that now considered necessary in aviation medicine In addition the dynamic physiologic tests to determine the maximum effort that could be safely exerted expressed in terms of several variables were considered most important These are carried out by Dr Ulrich Luft as part of a research program of the Lovelace Foundation It was considered also that the stress tests being conducted at Aero Medical Laboratory together with psychiatric and psychologic test and full anthropology data would be necessary Consequently machine record cards were designed and used to record the results of these data

and talents in assisting in the development of usable machine record cards

An example of a machine record card used to record dynamic physiologic tests is shown in figure 8

Shown in figure 9 is one of the 9 centrifuge acceleration cards to indicate the kinds of complicated information which may be recorded for the acceleration stress tests In figure 10 is shown one of the 2 altitude run cards indicating the variety of detailed information which is recorded on this tress test

Cards were developed for the following stress tests and other tests which were performed at the Aero Medical Laboratory

Centrifuge acceleration 9 cards
Heat stress respon e 3 cards
Altitude run with M-1 pre sure suit 2 cards
Bioacoustics noise test performance 1 card
Bioacoustics sinusoidal vibration 2 cards
Tilt table test 1 card
Harvard step test 1 card
Valsalva test 1 card
Cold pres or test 2 cards
Anthropologic data 8 cards
Psychologic variables 4 card

Master Card

Figure 11 shows the master card that is used to record basic information on the patient or examinee such as name identification numbers age sex marital status and race This card is extremely useful because from it all of the basic information can be automatically printed on the top line of each card in the deck as well as on duplicate decks if this amount of processing is desired Such a card requires a card punch operation Here the data recording is also quite straightforward If duplicate are not necessary a secretary or technician can merely write or type in as much of these data as necessary on the top line of each of the cards If addressograph equipment is available information may be printed using the standard printing plates They may be adjusted so as to print the name and number on the top line on the card face or the entire addressograph plate may be used to imprint the usual information on the backs of the card

The master card is also designed to be read directly except for the name without the necessity for one to be an expert in IBM *method* This is because the original has the information *indicated on the* right hand side which the card punch operator uses *There is no* present method to accomplish this otherwise *The card is described*

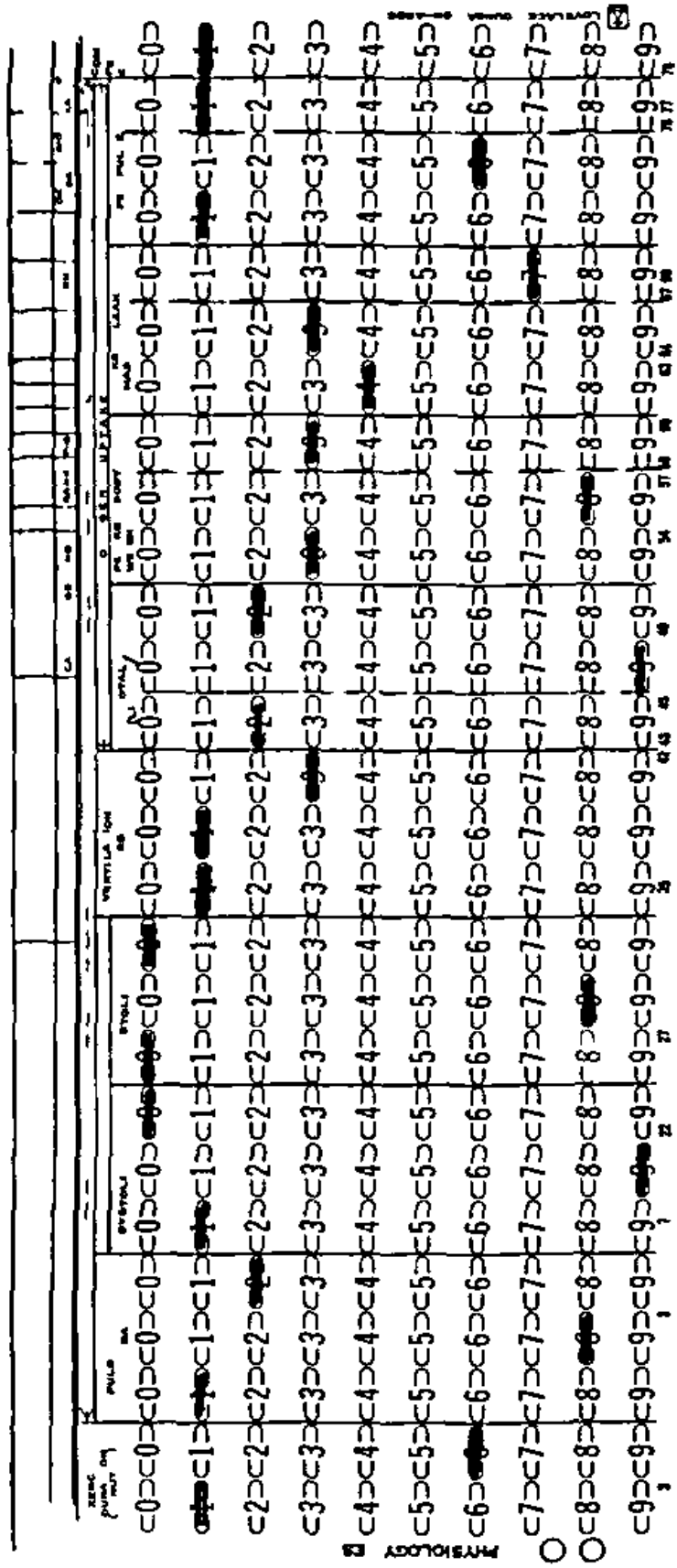


Figure 8. Physiology instrumentation (1 of 4 parts). The standard equipped to record physiologic dynamics.

Fig r 9 Cent ifuge accel ration (1 of 9 car le) Tl is car l i s l to recor l stress tests that we e de elope l for use at U S Air Fo e Aero Me lical Laboratory Wr ght l atterson A r Force Base

Fig 10 Altitud n (1 of 2) Th d d to co l t t t tl t w l l p l fo t U S Ai F
A o M l l l ho tory W gft l tt sun Al Fo B

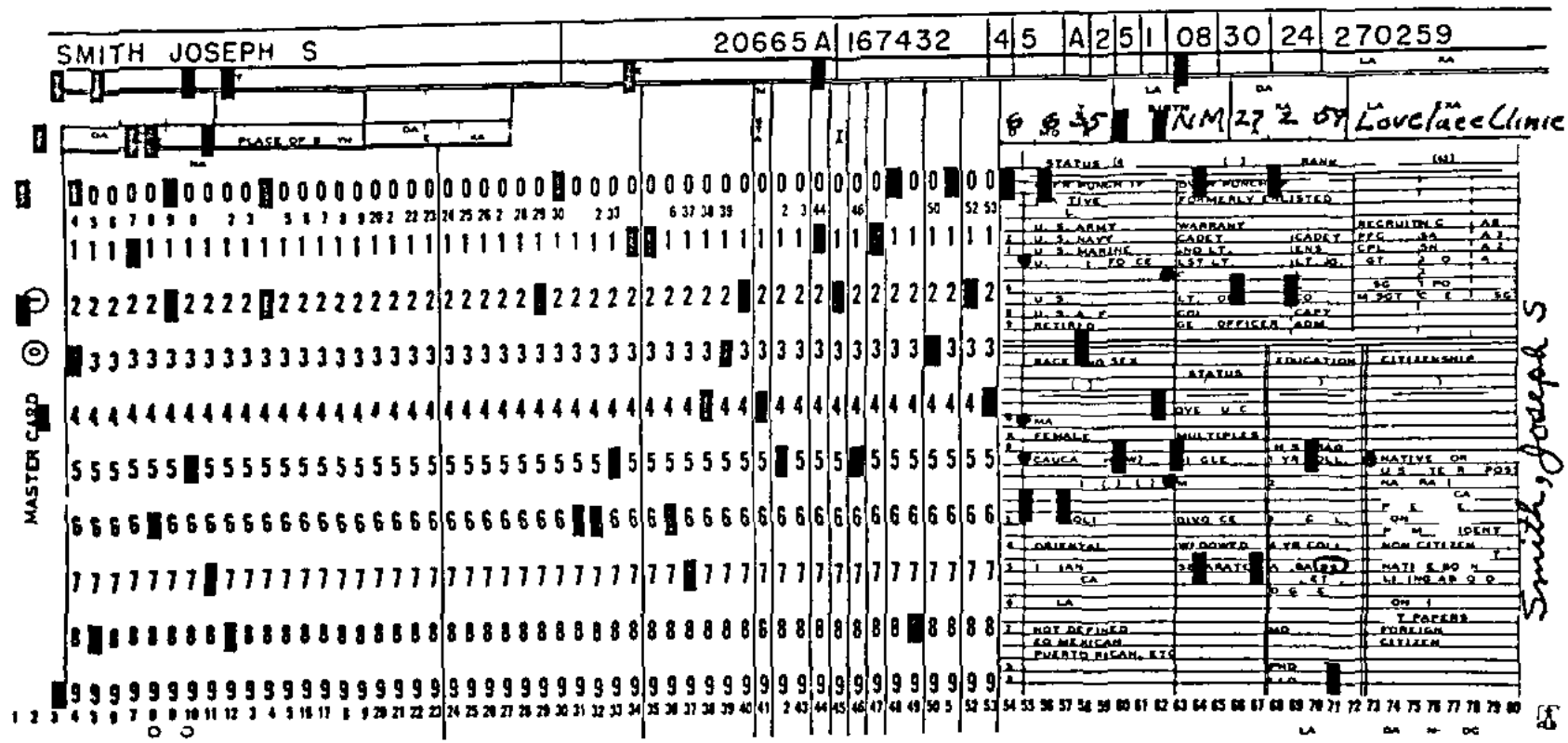


Figure 11 Master card. Unlike most punched data records, the system may be verified or read back without machine aiding.

briefly though in a bit more detail than the others to give some insight into the technics involved in developing such a card and into IBM technics generally

This card is made up for Smith Joseph S 20665A a captain U S Air Force he is married male caucasian with a college degree native born in New Mexico has 8 years of military service was born 6 June 1935 and is 24 years old was examined on 27 February 1959 and has case or hospital number 167432

The first vertical columns 1 to 23 are reserved for NAME—last first and middle initial

Since the machine record card is basically a numerical card in order to derive letters of the alphabet such as for names so called overpunches are used

The hundreds digit 10 overpunch has a tail to the left of the 0 and is called the 11 overpunch hole and is also called the minus (last first letter) hole the 12 punch hole The 12 overpunch is called the 12 hole with numbers 1 to 9 for letters A to I the 12 punch with 1 punched equal A to Z The 11 punch hole is called the minus letter J to R the 11 punch with 1 punched equal J to Z The 10 punch hole is also called the zero punch with the numbers 2 to 9 for the letters S to Z the 0 or zero punch with 2 punched equal S etc It is to be noted that with the 10 punch hole the numbers 2 to 9 are used to designate the letters O to Z the letters are used to designate the numbers 2 to 9 Using the blank plus sixteen digit punches directly above the numbers F to Z between the alphabet and numbers and blank

Column 4 to 8 are used for the date of birth the first 5 to right punched for the month The 12 punch plus 1 equal A to The other numbers read 20665A (last two digits of card)

Column 35 to 40 are reserved for the serial number The elf plus to

Column 41 to the left of the military S the card to (41) of right digit of Sc Smith a Air Force officer number 4 in 41 punched

Column 42 to 43 are used for the duty alphabetic military C lumn 42 is for officer rank and column 43 for listed duty of the duty allowed officer duty punch hole (punch 12) in 42 the punch hole to the number 42 and the punched hole in 43 Should the number 42 and 43 right for card

Column 44 Reserved for duty The hundreds of the code right for duty of Smith military code punch 12 digit

Column 45 Reserved for marital status Should right *Marital Status* A Smith married number 2 punched If hundreds be punched duty digit numbers 2 and 3 should be punched

Column 6 Edit Sign *Edit* right of digit Sec Smith has college degree punched sign plate to right military rank

Column 47 Citizenship See code *Citizenship* on right of card straight numerical Smith is a native born citizen punch 1

Columns 48 to *49* Years of service Straight numerical Smith has 8 years of service Punch 0 in column 48 and 8 in column 49 If he had had 16 year of service 1 would be punched in column 48 and 6 in column 49

Columns 50 to 51 Place of birth Straight numerical State or territory or other country in which born is coded on reverse side of card Number 30 equal New Mexico Here the code for place of birth is the same as that used by Selective Service

Columns 52 to *53* Age Straight numerical Punch 2 in column 52 and 4 in column 53 indicates 24 years old

Columns 54 to *59* Reserved for date of birth (*Day Month Year*) Two columns are for the day two for the month two for the year In this case Smith was born 6 June 1935 and is punched 060635

Columns 60 to *64* Also reserved for place of birth Alpha coded with over punch for alphabet same as name This gives A space *Mex* for New Mexico

Columns 65 to *70* Reserved for date of examination Two digits for each day month and year In this case the last day of the examination 27 February 1959 270259 Straight numerical

Columns 71 to *80* are unused They can be used for coding other information if desired In addition the top line of the card can be read in the same manner that it is punched by correlating with the matched columns that are punched

SMITH JOSEPH S	20665A	167432	Military Status (4)

Captain (5)	Male (1)	Caucasian	Marital status (2) Married	Education (5) College degree	Citizenship (1) Native born

Years of service Commissioned (8)	Born (State of birth) (30) New Mexico	Age 24	Date of examination 270259 (27 February 1959)

Cards to Facilitate Clinical Use

For completeness several other special purpose cards were added to the deck to facilitate possible clinical use One is a diagnosis card with room for 6 different diagnoses using 4 number codes The international modified standard or military codes may be used It is only necessary to indicate which code is used in the upper right hand corner of this card The physician merely writes the diagnoses on the back of this card in ink and a medical records clerk converts this to code as is usually done elsewhere except that the numbers are indicated by mark sense

Finally there have been devised a chief complaint card and a present illness card These are largely blank for the physician to write on This allows for the wide variation in these fields On the right hand side of the chief complaint card is a space for preliminary categorization of the patient in which the major divisions of the International Code are used This may or may not be used

These last 3 cards make po sible the use of this deck in clinics or physicians offices In addition to these it is thought that the medical history the physical examination and appropriate laboratory cards are all that would usually be needed The cards u ed to record the results of specialists examinations would be used only in instances where consultations are indicated and could be added to the deck at any time Blank card may be obtained and u ed to write progres notes if desired It is considered that a card may easily be developed for this special purpose indicating the usual conditions the physician notes under the e circumstances and al o allowing generous space for additional notes

USE OF MEDICAL MACHINE RECORD CARDS IN ASTRONAUT CANDIDATE EXAMINATIONS

Prior to the arrival of the candidates cards were prepared with name and number and distributed to the various sections of the clinic in volved The tests and examinations were done on a schedule and the results recorded on the machine record cards At the completion of the examination the machine record cards were gathered together from all the departments and reas embled into decks one for each examinee and checked for completeness proper markings and pos sible mistakes in recording Where questions arose additional con sultations or laboratory tests were done as indicated A written sum mary of all positive findings and other vital information was easily prepared from the information on the card and each case considered by a board of physicians all of whom had some years of background in aviation medicine

Meanwhile the decks of cards were taken to the IBM facility at Kirtland Air Force Base New Mexico where the original cards were automatically punched and a number of duplicate decks made One of these for each candidate was sent by courier to the Aero Medical Laboratory and used in connection with their examinations This processing required approximately 2 hours for the 6 examinee seen each week This is considered a remarkable achievement ina much as no similar program had ever been attempted previously This re flected th k ll nd devotion to duty of the Air Force and civilian person el who because of the timing did this task almost entirely at night or luring week ends as an important contribution to this national effort

When all 3? examinations were completed the data were assembled and considered at the Langley National Aeronautics and Space Admini tration Laboratory by a group that included a repre entative

from the special advisory committee on Life Sciences to NASA the Aero Medical Laboratory the Lovelace Foundation and officials of the National Aeronautics and Space Administration and Project Mercury The final selection of candidates was made in light of this by the National Aeronautics and Space Administration

ACKNOWLEDGMENT The authors wish to express their appreciation to Mr R B Thomas and Mr J W Titus the representatives of International Business Machines Corporation in Albuquerque New Mexico for their helpful and generous assistance in reviewing the basic knowledge of IBM and mark sensed card and for furnishing the large size layout forms and to the Daniels Business Services of Asheville North Carolina who printed the machine record card

REFERENCES

1 WOODBURY M A Personal communication
2 GRAYBIEL A Personal communication
3 HARRIS A ROSENBERG A A and RIEDEL L M *Microflocculation test for syphilis using cardiolipin antigen preliminary report* *J Ven Dis Inform* 27 169–171 July 1946
4 LEDLEY R S and LUSTED L B Using electronic computers in medical diagnosis Presented at 11th Annual Conference on Electrical Techniques in Medicine and Biology Minneapolis Minn November 19–21 1958
5 LIPKIN M and HARDY J D Mechanical correlation of data in differential diagnosis of hematological diseases *J A M A* 166 113–125 Jan 11 1958

THE ART OF HEALING

Hypnosis is in one of its periodic revivals Better than trying to put the patient into a trance is unplanned suggestion faith and confidence inspired in the patient by the kind of man his physician or dentist is and an instinctive rapport between the two Methods of treatment which ordinarily succeed fail when doctor patient understanding is absent less certain therapies work well when trust prevails This is not a technic to be studied a set of rules to learn It is an art to be developed Some men have a natural bedside manner and people love and trust them Others annoy and make sympathetic understanding difficult The doctor who possesses this quieting power need far less aid from anesthetic and drug *H* the remedy — W B RIPPLE The Mouth Its Clinical Appraisal Anesthesia Drugs Diet and Nutrition *American Practitioner and Digest of Treatment* February 1959

Case Reports

Appendicitis Treated Nonsurgically at the South Pole

LIEUTENANT VERNON N HOUK MC USN

CONSERVATIVE nonsurgical treatment of patients with acute appendicitis under suboptimal conditions has been receiving more support in recent years Bowers Hughe and Bonilla presented several case histories in which all the patients treated initially by nonsurgical measures prior to evacuation later came to appendectomy when transferred to a large hospital Indeed even under certain conditions where no evacuation is possible the nonsurgical management of acute appendicitis is desirable The present report concerns one such patient at the Amundsen Scott International Geophysical Year South Pole Station which is located a few hundred feet from the geographic South Pole and from which no evacuation is possible 9 or 10 months of the year

CASE REPORT

A -y r old m n p e e t d hims lf i the middl f the night ith ight bd m l p i iti g d d h Th i ent ill h l begu d y p i r t thi ti e with ia nausea l bd mi l d mf rt He did n t eek medical ca i iti lly becau e thes n ymptom h d oc cu ed a d s bsided r l t m the p t f w y h e th y i a ed i s ity ntil h acut ly ill

E am ati n r led a w ll le l ped ell no h d whit m n i ath ute d st e H temper t w 10° 8 F p lse t 1 0 pe m nute blood p es 110/ m Hg nd pir ti 18 pe mi te d regula Positi fi d g e l mited t the abd m whi h h ed 3 pl ght l w q d a t igidity a l t d rn i th ight l qu d a t ith 4 pl r b d t l e Tl e p a l bt i at r ign we e po iti Rectal am i tio h ed th ri ht sid t be h t a d t d N lefinit a wa p lp bl Th wh t bl od cell co t 13 800 pe cu m th hift to the left in l di g many y g ba d fo m

Th pati t w put o complet bed rest gi n thi g b m uth, fed t no l a d gi n 30 mg f yt t acycli e hyl ochl d i t e i ly 6 h 3 h r pe iod a d 0 9 mg of tr pi e He w t hed

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F m Am d S tt IGY S th P l Station A t tic Lie te a t H k l a gned t U S N l Hospit l Bethesda Md

carefully and although the symptoms increased in severity he was afebrile within 12 hours There was a marked drop in the number of white blood cells primarily the granulocytes The patient remained afebrile Crystalline penicillin G 8,000 000 units per day intravenously divided into 4 hour administrations and 1 gram of streptomycin sulfate every 12 hours intramuscularly were started Oxytetracycline hydrochloride was discontinued and he was placed in the Fowler position

Sixteen hours later the temperature again rose to 103 F although the white blood cell count remained depressed for 24 hours when it took a marked rapid rise with a shift to the left White blood cell and differential counts were done every 4 hours during this period After 48 more hours the symptoms subsided A mass in the right lower quadrant suspected upon examination of the abdomen was *definitely felt by rectal examination* The patient temperature slowly dropped to normal and after 6 days of treatment he took small sips of tea and broth The white blood cell count remained around 10 000 per cu mm with a normal differential The patient tolerated increased oral feeding well the mass regressed his temperature remained normal and by the end of the 14th day when the mass was no longer palpable he was returned to moderate duty His course throughout the remaining 6 months of his stay at the station was uneventful and he was asymptomatic He left the station with instructions to consult his private physician upon arrival in the United States

DISCUSSION

The conditions at an isolated antarctic outpost are indeed suboptimal The author has had the unfortunate experience of performing a 6 hour surgical procedure on another patient aboard ship under suboptimal conditions A grossly necrotic cecum and a perforated appendix were found At the South Pole however no oxygen was available for anesthesia Open drop ether was impossible because less than 10 feet away from the operating table was an oil burner stove heating the building The outside temperature was −90 F The vials of Pontocaine (tetracaine) hydrochloride for spinal anesthesia had been frozen and although in the dry crystalline state they had coalesced into a solid mass It was not known whether this material would be safe to use The author was the only physician present and he had no postgraduate surgical training beyond the internship None of the other personnel were from any field ancillary to medicine so that little capable help could be expected The date was early July at least 5 months before a plane could land Because of the above cited reasons nonsurgical management was elected

Although it is not possible to confirm the diagnosis it is believed that this illness was acute appendicitis in a retrocecal or other pelvic position which progressed to an overwhelming infection (evidenced by the immediate drop in temperature and white blood cell count) and for which oxytetracycline was not the drug of choice Upon addition of the penicillin and streptomycin sulfate the fever and the

cytoplasmic vacuoles With more severe and prolonged exposure this mild form of injury might progress to symptoms severe enough to incapacitate the individual for several days The following case history illustrates the most severe form of injury observed

CASE REPORT

A 28 y ld h l d be n at the tat n than 9 m th (d thu sh ld ha e been a cli n ti ed if that e pos ible) w l lli g o-pou d sled th gh soft n th u fa f whi h n ked b y u l sa tru-l. Th ir nm tal te pe at e mi 9° F the w k p od ced raj d deep breathi A lefi it ti f cold with no elem t f pai w oted deep n th l g ft b t l mi tes f xpos Wh n th bject ived t a w r b il li g dy p ea se e e c gh p du t f thi blood putum a d l l pirat y whee i g th t ld b h a d at e di t we n ted Th ympt m r j idly i ased i v it f 3 h u Th w no p t h t y f p lm y difficu lty thm F am ti hov ed a ll-de l ped ll n iri hed whit m n i th r a te esp t ry di tres Tempe t 97 4 F pul 1 0 bl od p ure 130/80 mm Hg l pira ti 34 j m ite deep a d l b ed Cy f the il bed and of the lips was n ted Th tl x h ed d ing p ati P u l of th hest re led ge e l hype es On lt ti xpi at y whee es w h d th pi at y ph se w prolo ged that the l sp t ry-e pi t ry atio w 1 3 Ro hl we h d o e th e ti e ch t \ th b rm l *tie w n ted*

The pat e t w pla ed in b d but th pnea was so that the itti g po iti w eces y f pp im t ly 1 h ll wa t ted ith la ge doses f ti a d ant hi t i l f th fi t 4 h u t a il but afte that th sublingu l dm i trati f 10 mg of Is p l (i p ot l) hyd ochl rid g e p ti l l f better th n th t p oduced b I p l i haled by hand n bul No t f wa btained f m ubcut eo dmini trati n f pineph i O yge v n t a ail ble Sp t m prod ti n was l itially p pe d y b t lec a ed in m nt a o-d y pe iod the p tum w gro ly bl ody t bl od t eak d d stai o demon t t d m y ciliated d o ciliated pith lial cell with l ted cyt pl m Th p. tie t remai d i bed f 3 da th ympt m g du lly bs d g until t th d f the si th lay th w b t a d h w bl t p oceed ith h n m l d ties

COMMENT

It is felt that the above case history illu trates a new etiologic basis for pulmonary insufficiency of a transient nature due to cold damage to the bronchial tree including its smaller divi ions Although large doses of cortisone and of antihistaminics were tried in several indi viduals presenting mild to severe forms of the injury on the theory that the symptoms might be the result of bronchial spasm from cold hypersensitivity these drugs were of no therapeutic value Isuprel the only bronchodilator drug used in all instances gave greater relief

on oral administration than on nebulization It is unfortunate that no roentgenograms re pirometry gas exchange or blood saturation determinations could be performed and that oxygen administration was not possible

It is hoped that this report will stimulate the pulmonary physiologist to consider cold as a cause of pulmonary insufficiency The subject is of military importance because judging from the author s experience of more than a year, troops operating in temperatures below minus 60 F may encounter a high casualty rate from this injury

SUMMARY

A new etiologic basis for acute pulmonary insufficiency has been reported A case history of transient injury to the bronchial tree caused by deep breathing in extremely cold environmental temperatures has been presented It is believed that this injury deserves careful study because of the degree of disability, and because of the significance of the phenomenon, particularly in military life

REFERENCES

1 Moritz A R and Weisiger J R Effect of cold air on air passages and lungs an experimental investigation *Arch Int Med* 33 240 Apr 1924
2. Webb P Air temperature in respiratory tracts of resting subject in cold *J Appl Physiol* 4 3 8–38 Nov 1951
3 Glaser F M Berridge I R and Prior K M Effects of heat and cold on distribution of blood within human body radiological investigation of liver lungs and heart *Clin Sc* 3 181–186 May 30 1940
4 Smith S cited by Moritz and Weisiger
Milligan C B Personal communication to Moritz and Weisiger

Urethral Hemangioma

CAPTAIN WILLIAM MORRIS MC USN
COMMANDER BURDICK G CLARKE MC USNR
LIEUTENANT COLONEL FERRE MC USN

HEMORRHAGE due to urethral hemangioma may be difficult to control The rarity of this condition and the satisfactory results obtained from treatment by fulguration prompt reporting of the following case

From U S Naval Hospital Great Lakes Ill and Department of Surgery Tufts University School of Medicine Boston Mass

Q f e yphili a d p itt co is an l elect c li g t s v e eg ti e Sp tum as ne r p od d A port ble chest roe tgeno r m admi i e- ve led mult ple bil t l nodul ɪulm y i filt ati n (fig 1) Repeated film ealed l leari g ɪnt l 1 M l ɪ h th ro ntgen gram w s se ti lly no mal

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F gur 1 P rtabl h t roe tg nogr m 10 F bru ry 1959 12 h u ft dm reve l ng mult pl nod l p lmon ry infiltrat ons.

pongi g aspi in, int a us fluids yge peni illin and chlo amph nic L Fi e h l t m i tal d in an o yg n te t w th old t wel v hi abd me he still w t lly ill dy p ei y noti d d o i t d H tempe atu was 103 8 F pul 11 r piration 36 and blood p essure 118/ 0 mm Hg H h d cc i l np du t cough A t t tive d agn is f hick npox pn um i w m l Becau th p tient diti n appe ed itl l te d th apy w th gl t t be d ted A t bi ti th ɪy va t d bec u ba t r l p m i could t b led o t B gi i g at 0900 h s n th

ame day therapy with intravenous hydrocorti one wa begun and 300 mg wa given in the ensuing 24 hours The patient al o received 60 million unit of penicillin and 4 grams of chloramphenicol At 1700 hour 8 hours after the hydrocortisone and high do age of antibiotics were begun he had improved remarkably His temperature was 99 hi pul e 30 and hi re pirations 24 He was no longer cyanotic dy pneic or disoriented At 0800 hours on 11 February he was hungry and no longer required oxygen In the next 4 day he received prednisone in daily dosages of 80 80 40 and 40 mg Penicillin and chloramphenicol were continued for one week at moderate dosage Convalescence was uneventful The skin le ions healed with a minimum of econdary infection

DISCUSSION

The diagnosis of chickenpox pneumonia is a presumptive one based on clinical findings[1] In association with the typical rash of chickenpox there is an acute onset of dyspnea, cyanosis and cough Sputum is usually produced and may be blood tinged The temperature is high, the pulse fast, and the respiration is rapid and shallow Physical examination reveals a paucity of lung findings The chest roentgenogram reveals multiple bilateral nodular pulmonary infiltrations which clear slowly The white blood count is 4,000 to 15,000 cells per cu mm with less than 80 percent neutrophils The sputum and blood cultures are negative The patient is critically ill for 1 to 7 days, with rapid clinical recovery

Apparently antibiotics do not affect the virus of chickenpox[9,11] The status of steroid therapy in the treatment of chickenpox pneumonia is uncertain Patients are described as becoming afebrile within 24 hours after receiving hydrocortisone[17] or prednisolone[2] The patient described by Rosecan, Baumgarten and Charles[13] was difficult to evaluate because of the shock, congestive failure and pulmonary embolism which complicated the course Our patient had marked clinical improvement after receiving hydrocortisone In the 4 patients with chickenpox pneumonia who were treated with steroids including the one reported here other forms of treatment such as oxygen, fluids antibiotics and salicylates were used Furthermore the clinical course usually ends abruptly Therefore the effectiveness of steroid therapy in the e ca es cannot be determined Prompt clinical improvement following the use of steroids suggests that these agents may have been beneficial There was no evidence of harmful effect Further trial of teroids in the treatment of chickenpox pneumonia appears justifiable

REFERENCES

1 Wasin J J Nelson R T and Feiner H F Severe forms of chickenpox in adult with atypical evanescent lung infiltration pneumonia and encephalitis Arch Int Med (Chic) 84–408 Mar 1949

O PENHEI R, E H Con enital chickenp x with di mi ated isceral lesions *B ll Joh s Hopk s H p* 4 40– 0 Ap 1944

3 GRAYSON C E a d BRADLEY E J Disseml ated chickenpox (p monia and neph itl) *J A.M.A* 134 123 1.39 Au 9 194

4 CLAUDY W D Pneu o l a ciated with va icella review of literature d report f fatal case w th utopsj *A l I t Med* 80 18.–19 Aug 194

5 RAUSCH L E G LE T J and MU SER, J H Atyplc l p eumo a com pli ati g e va i ella in ad lt *Ne O l s M & S J* 96 271 7 Dec 1943

6 WESSELHOEFT C a d PEARSON C M O chitis in cou e f se ere hicke pox ith pneum lt s f ll wed by test cula atrophy Ve *E gl d J M d* 4. 6.1–6. Aj 19.0

7 J HNS N H \ Vi ce l l si s associ ted with icell *A ch Path* 30 29 –307 July 1940

8 LUCCH I P F LA BOCCETTA A C and P A A R \ ricella neo at rum *A J D Child* 73 44– 4 Jan 194

9 BUNN P A a d HA MON J D Chick pox compl ated by e pneu monia t eated with aur mycin \ y *k J Med* 0 148.–1487 June 15 19 0

10 FRANK L \ ric ll p umonit s r port f a e with a top y b ti ns *A cl P th* 0 4 0–4 6 O t 19 0

11 MICHEL, J C COLE N D H and KIR Y W M M Pn um i a ciated with h cke p p t of p ti t t ated with aureomycin *Am. Pract & D ge t T c t* 7–.9 Ja 19 1

1 E s M Chi k po with \is ral i ol me t *Am J Med* 1. 740– 46 J 19

13 R c \ M BAUM EN W JR. a d CH LE B H \ ricell p m ia witl h ck l h t f lu e 1 *I t M d* 38 830–84 \p 19.3

14 S LAW S P TOR J A a d WISEMAN B k \ cella p eum ia *A M A A ch I t M d* 91 3.–4 J 19 3

1 H M TO A G JR. P imary aric ll p mo i *A.M A A ch I t M d* 9 137–140 Jan 19

16 W L a d M A R H R pi to y ma if t ti f chick pox peci l c d t n f f t f p im y i ll p m i *A M A Arch I t M d* 98 91 99 J ly 19 6

17 F R H an l M IKLEJ H G \ari ella p eumo ia i d lt *Am J M S* 3 489–499 \ v 19 6

18 S U H RD M E R e tgen fi di g i chi ke p x p um r i of lite t d po t f i *J R tg I* 6 .33–.39 Sept 19 6

19 C IEY R G C W E d H s r G R \a i lla p e mo i c epo t 4 *I t M d* 4 18– Sept 19 6

0 E DR S *Z* F and SCHNELL F R \a i lla p eumon tis *R d logy* 66 7.3 May 19.6

1 KR s \ Chicke po pneum ia c ep t *P d ol gy* 66 – 99 M 19.6

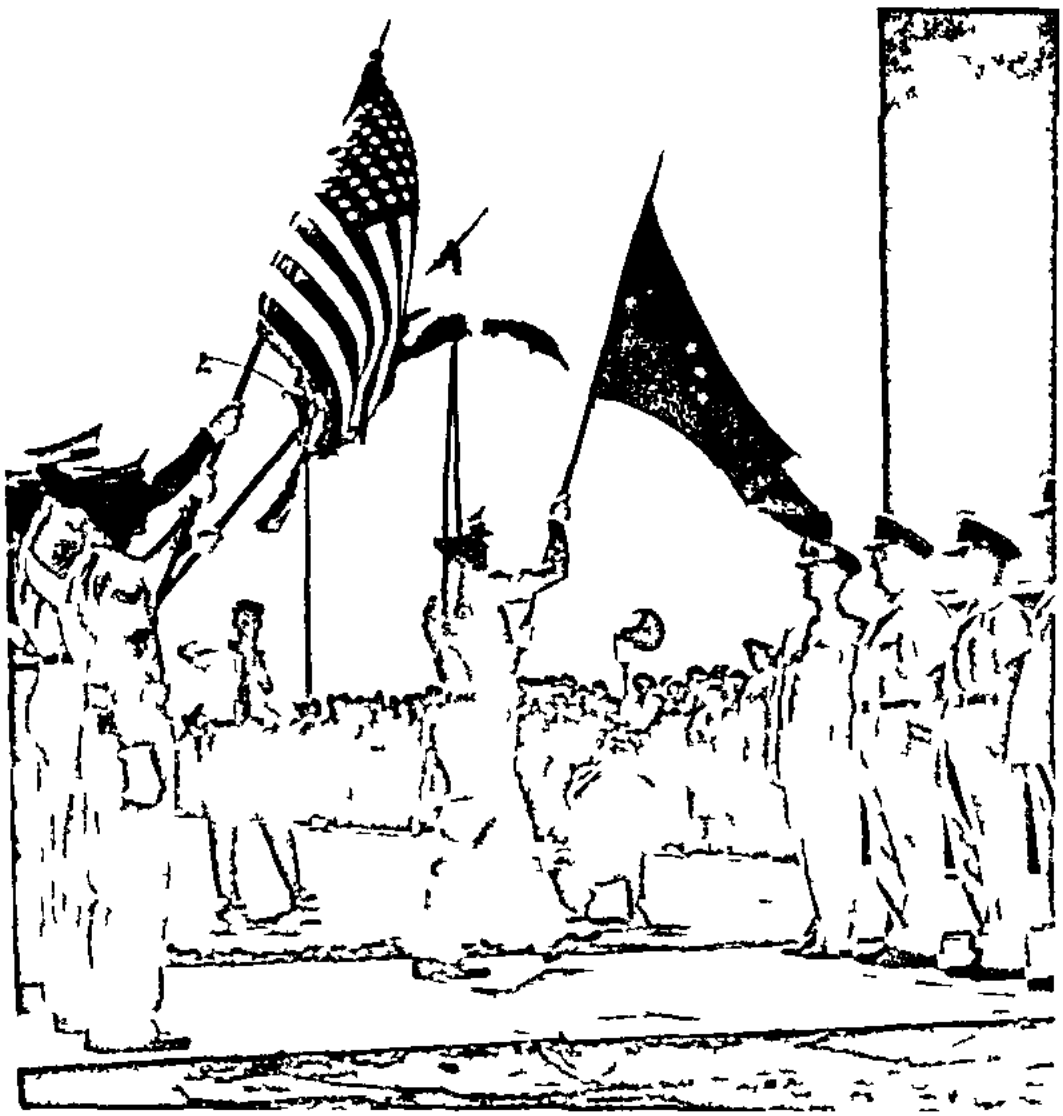
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Military Medical News

AEROSPACE MEDICAL CENTER ESTABLISHED



Formal military ceremonie marked the establishment on 1 October of the U S Air Force Aerospace Medical Center with headquarters at Brook Air Force Base Texas From the color guard presenting the flag of the School of Aviation Medicine Maj Otis O Benson Jr USAF MC commander of the Center Maj General Carl A Brandt USAF Vice Commander Air Training Command Brigadier General M S White USAF MC Surgeon

T ai i g C mma l d B iga lier Ge l J m G Moore USAF MC co d r f th U S Ai F ce H jital I kl d Ai F ce Base T

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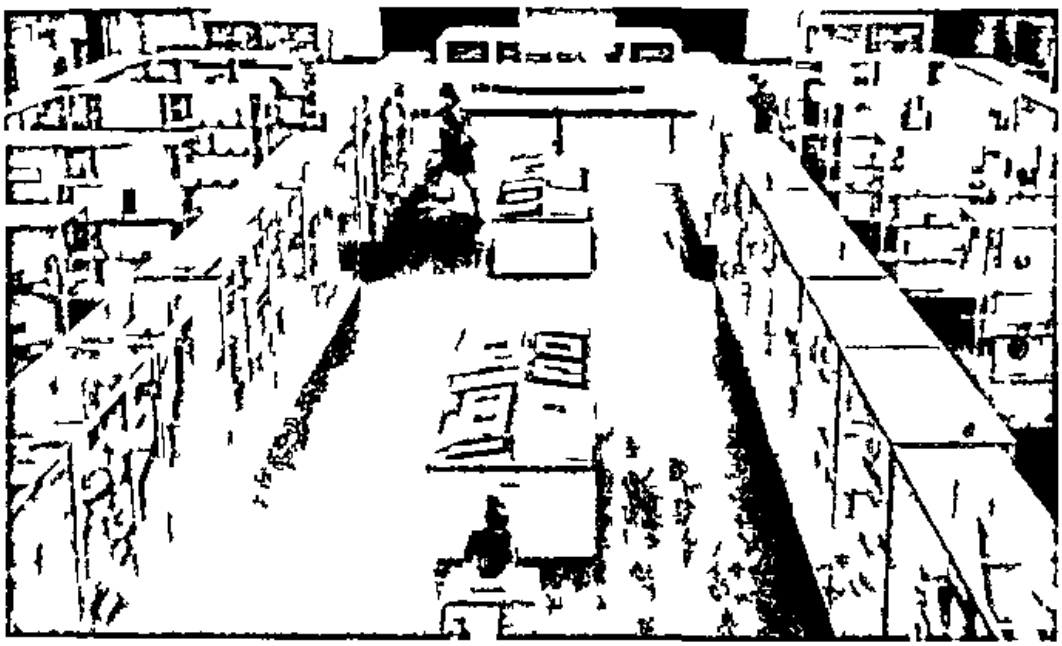
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Officers Certified by Specialty Boards

Tl ge gen l f the milit y edi l l e h e a n u ced th t th f ll g r g l M d c l C rp ffi h be n certified

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Ande so Geo g R Capt USAF

Cutler K y R Maj USAF
Occ pat l M di e
Ros ink l N E Lt C md USN



HISTORIC MEDICAL INSTRUMENTS Th A ed F s I t tute f P tl l rj M di l M e i t bli hed l g the C l W by Brigadie G er l Will A H l S rg G l f the A will l l at it 100th N 1961 d i g th Civil W C t i l I ecti n w tl thi l b t mu ffi i l eeki g illita i ed al t i l t j d d co l l t y f t H t i al h lit A ng th it I ti ul ly l d li t i l m di l i t nt f C f l r t Ar y gl Mi sc pes i t l l y th f 19 0 t tl i ese t a e l o d ir l

Official Decorations

The following awards were recently announced by the Departments of the Army Navy and Air Force

Legion of Merit

Victor A Byrnes Brig Gen USAF MC

John R Copenhaver Brig Gen USAF MC

Elbert DeCoursey Maj Gen MC USA

Loyd E Griffis Brig Gen USAF MC

Navy and Marine Corps Medal

Albert R Behnke Jr Capt MC USN

Army Commendation Ribbon with Metal Pendant

Oscar Fesenfield Lt Col MC USAR

Clifford C Lardinois Sr Capt MC USA

Charles H Segars Capt MSC USAR

Robert B Skinner Col MC USA

Ernest F Rezendes Capt. MSC USA

James T Richards Col MSC USA

Air Force Commendation Medal

Charles H Bramlitt Col USAF MC

Charles M Sanders Capt USAF MSC

First oak leaf cluster

DR BERRY IS SPEAKER

Dr Frank B Berry MD Assistant Secretary of Defense (Health and Medical) gave an address at the recent annual meeting of the Kentucky State Medical Association in Louisville Speaking at the president's luncheon Dr Berry described the functions and activities of his office in Washington

CHENAULT RETIRES

Captain Oran W Chenault MC USN assistant chief for aviation medicine Bureau of Medicine and Surgery for the past two years retired 1 October after 29 years of naval service Entering the Navy shortly after his graduation from the University of Arkansas School of Medicine in 1930 he was stationed at the Naval Hospital in Pearl Harbor at the time of the Japanese attack in December 1941 and was interned there for 13 months He was designated as a flight surgeon in May 1942 A fellow of the American Academy of Ophthalmology and Otolaryngology Captain Chenault is president elect of the Aerospace Medical Association

ARMY OFFICERS HONORED

Lieutenant Colonels Carl W Hughes and Arthur Cohen MC USA and Major Eleanor H Faulk and Blanche M Stewart NC USA members of the Army surgical team which operated on the prime minister of Thailand Field Marshal Sarit Thanarat earlier this year were recently awarded high decorations by the Thai government

Colonel Hughes chief of the department of surgery Tripler Army Hospital and Colonel Cohen chief of general surgery services Walter Reed Army Hospital were named as Commanders of the Most Noble Order of the Crown of Thailand Maj Faulk nurse anesthetist and Maj Stewart operating room nurse both of whom are stationed at Tripler Army Hospital were awarded the Most Exalted Order of the White Elephant

KIDDER RECEIVES STAR



B ig d G al Jame H I dder MC USAR wl has served p c l a ta t t th Army g g l f r es ffairs 1955 w p o- mot d to l i p es t r nk 1 Sept mber De f F dh m Un ty C ll ge f Ih ma y f m 1932 t 1955 wh n he b m D n E e t G e l I dd l p f f el e l g ry at Ne Y k Med l C lleg a d lt t t tw th N w Yo k C ty ho p t l C mm t tl US \ my R i 19 8 foll 1 g l s g d tion f n C ll U ty Med c l C ll g h h 31 ye f co t u e 1 el 1d g fi s f t d ty i g W l l W II

COL FI ETCHER CITED



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Progress Notes

Major General Thomas J Hartford MC USA deputy surgeon general of the Army recently received his second star Captain Ralph D Berry MC USN attended the Second Brazilian Congress on Military Medicine 24–31 August, in Port Alegre as a representative of the Office of the Assistant Secretary of Defense (Health and Medical) and the Navy Medical Department Lieutenant Colonel Ingalls H Simmons MC USA chief of the department of preventive medicine at the Army Medical Service School left Fort Sam Houston in August to become chief of preventive medicine for the Communications Zone in Orlean France Captain Robert P Irons DC USN recently retired after nearly 32 years of naval service

Captain Edward J Holubek DC USN has assumed command of the U S Naval Dental Clinic U S Naval Base Brooklyn New York succeeding Captain Francis W Lepeska DC USN who retired in July after almost 30 years of active service Captain Holubek was senior dental officer at the U S Naval Station Newport Rhode Island Colonel Laurence M Hursh MC USA chief of the medical research division Army Medical Research and Development Command recently received the silver eagles of his new rank in a ceremony in the Army surgeon general's office

Captain Horace D Ward n MC USN stationed at the U S Naval Hospital Philadelphia Pennsylvania has recently elected a fellow in the American College of Chest Physicians

Captain Slakeeb Ele MC USN chief of surgery at the U S Naval Hospital Great Lakes Illinois has been appointed assistant clinical professor of surgery at Marquette University School of Medicine He is the first Naval Medical Corps officer on active duty to join Marquette's medical faculty Colonel Edwin H Smith Jr DC USA was recently promoted to his current rank He is chief of the career management branch in the dental division office of the Army surgeon general Captain Albert E Morris MC USN stationed at the U S Naval Air Station Quonset Point Rhode Island has been elected as a fellow in the American College of Preventive Medicine

Captain William M Snowden MC USN deputy director of the Aviation Medicine Operations Division departed the Bureau of Medicine and Surgery in August to assume his new duties in San Diego on the staff of the Commander Naval Air Pacific He has been succeeded by Captain Melvill H Goodwin MC USN who was assigned at the Naval Air Station Quonset Point Rhode Island Brigadier General George M Powell MC USA commanding general of Madigan Army Hospital was promoted to his present rank in July Lieutenant Commander Lynn T Greene MC USN was recently elected a fellow in the American College of Apothecologists

Colonel Nicol F Ata USAF MC commanding officer of the 18th Tactical Hospital Okinawa retired 31 July after 2 years of service Captain Joseph J Tomme MC USN stationed at the U S Naval Hospital St Albans New York has been elected to associate membership in the American Association for Thoracic Surgery Colonel Ronald I Kirk USAF MC left the Air Force in June after 0 years of service Prior to his retirement he was deputy surgeon Headquarters Alaskan Air Command Elmendorf Air Force Base

Colonel Donald L. Ferri USAF MC deputy surgeon at MATS Head

Medical S ice S hool, B ook Army Med cal C t Captain Luther G B ll MC USN executi e ffice and directo f p fessio al servi es, U S N al H pit l Ch l ea, Massa ch setts, ucceeded C ptain J rry T M MC USN s mm di offic f the U S N l H pit l Co p Ch i tl Te as when the l tte was igned t the M rin C rps Re- c uit D pot San D ego C lif n a

ACCREDITED HOSPITALS

Th J i t C mmi s n on Acc dit ti n f Ho p tal mpo ed f p e- tat es of the Ameri a Coll g f l hy i i Am i n C llege f S geo Am c n Medical A oci ti n and the Am i an Hosp tal A soci tion h i pected d ac ed ted th U S A my H pit l t th f ll wing loc ti n

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PARACHUTE DOCTORS

Only ty ns wh wea th wi gs f a pa t oop i additi n t Med l C p ins n a l gible f of the Army h ghest l l lubs It m mbe fly nd j mp with th 8_d and 101 t Ai bo D vi n d l l d three medical fficers stati ed ith th 8th I f t y D vi n in G ma y M mbe h p ow t d t 3- with 10 m p ospecti m mbers in t i ng P troop ph m l l te th f ll cy l f pa troop trai g d m k at l a t f u p fici ncy j mps e jump i g h t m th i it j mps

This Is Your A M A

THE COMMITTEE ON MEDICOLECAL PROBLEMS as its name implies is devoted to the task of improving the day to day working relationships between two fine groups Since its inception the membership of the American Medical Associa tion has been well aware of the mutual concerns of medicine and the law At its 1849 meeting in fact the As ociation created a Committee on Forensic Medicine A major step in setting up the machinery for handling the medicolegal interests of the A M A was the creation in 19?? of a Bureau of Legal Medicine and Legis lation This was merged into the Law Department (now the Law Division) in 1954 Even during the existence of the Bureau when particular problems came along the Board of Trustees would appoint special committees to consider them There were for example committees to study the utilization of blood tests in disputed paternity ca es the use of chemical tests to determine alcoholic intoxica tion and the relationships between medicine and the law particularly o far as the medicolegal investigation of death is concerned In 1950 all the e com mittees some relatively inactive at that time were merged by the creation of the Committee on Medicolegal Problems

Since its organization the committee has designated certain subcommittees to do preliminary work in investigating various problems and in each instance a member of the committee has acted as chairman of the subcommittee There are subcommittees on tests for alcoholic intoxication on medicolegal aspects of blood transfusions on blood tests in disputed paternity ca es on profe ional liability on teaching of legal medicine and medical jurisprudence in medical schools on status of the coroner system and the medical examiner system in the United States as well as others Numerous reports relating to the subjects represented by these subcommittees have been prepared A partial listing of some of the e reports which have been approved by the committee as a whole and are available to the profession on request follows A Sugg ted Course in Legal Medicine for Medical Schools Test Your A Q (Alcohol Quotient) Medico-legal Aspects of Blood Transfusions Medicolegal Application of Blood Group ng Tests Medicolegal Applicat on of Blood Grouping Tests (S pplem ntal R port) and Malpractice and th Phys cian

The director of the A M A Law Div sion s a member of the committ e a d one of the members of the Law Di i ion staff acts as its e ecut e ec etary Collaboration between the Committee and the Law Divis on is th refor ery close One project in which the two groups coop ated a a comp eh n iv sur ey on the problem of medical p ofe s onal liabil ty throughout the country The result of thi urv y ha e been publ hed in *The J al of th Americ n Med cal Associati n* and ha e been the subject of d cu ion at numerou medical meet ngs Another joint activity has been th prepa ation of a serie of m dico legal film and the pon or ng of regional medicolegal sympo iums To dat four films have been p epa ed The Medical Witne demon trating th right and wrong way to prepare for an l gi e m lic l t st mony Th Doctor D f n l portraying the activities of a medical review committee The Man W Walk a tudy of the problem of traumatic neuro is and A Matt r of Part ing the benefit of u ing prop rly train d persons in medicol A fifth film is pre ently under study In the fi ld of liv film a cript wa prepared for a mock trial demonstration

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F m th C ncil N ti l Def f th Am ica I pl l re el re t ceed rily th f th

ca whi h wa p e ted to phv i i l wy a d ences i m th n h lf d n as ound th c t y R g l m d coleg l symp m h e bee h ld th years 1955 1957 d 1959 i locat ons g ng f om Wash gto t D d f om S lt Lak C ty t Atlanta Som f the ubjects covered t th m t g w hemi l t t f i t xi ati t ma a d canc r impart l med c l t t m v t m t os ti t rp f i l od a d m lp ti

Th p t j r el of th mm ttee o st f t tand ng r p e ent t es th fields of fo e c p thol gy f ns c p ych t y fo n to ology d h m tology m d c l g l ducati n d l w Cu tly be ng studi d by th m n re the mp o m t of th c d m d c l m n syst m for mak g m d col g l t g t ons th f th c f th f bl od g oup g te t p t ty th f rm t of ub mm tt es t t dy me of the m h dou fi ld f m d al pr ct i h l g term d m g s f om x y r d t se s t ty to i b t g t c d sc tati n f t t t t d th rs d th p p t of m m d cal films a d m d ol g l h b t

The film pre u ly m t ed as b g mpleted a e l bl f by m d l g p Th y m v b bt d by w ti g t the F lm L b a y Am M d cal A o i ti 535 No th D b n St t Ch g 10 Ill P mphl t and f m to m y b bt ed by w t g t th C mm tt o M d l g l P blem t th m add

Monthly Message— t ed f m p g

As to the third axiom the ability of man to vary his behavior it is indeed fortunate that this is so Today with two conflicting ideologies—(1) respect for the individual and (2) the authoritarian tate—we of the free world must exploit the ability to *change* and *vary* our behavior not only to *meet* the challenges of the authoritarian state in which the individual is but a small cog but rather to *lead* forward and discredit this philosophy

Frank B Berry

FRANK B BERRY M D
Assistant Secretary of Defense
(Health and Medical)

DEATHS

HAMLIN HELEN MARTHA First Lieutenant AFRes NC of Pine City Minnesota assigned to 3973d USAF Hospital San Pablo Air Base Spain graduated in 1950 from Hamline University School of Nursing St Paul Minnesota appointed a second lieutenant in the Air Force Reserve 6 March 1952 reported for active duty 16 May 1952 died 26 August 1959 aged 30 at the 3973d USAF Hospital as a result of an automobile accident

HUNT OSCAR LEWIS First Lieutenant, MSC USAR of Chester Pennsylvania assigned to the 595th Medical Clearing Company Karlsruhe Germany graduated in 1956 from Morgan State College Baltimore Maryland appointed a second lieutenant in the Army of the United States 4 June 1956 reported for active duty 28 February 1957 died 14 September 1959 aged 25 near Saverne France in an automobile accident

KIRBY DUNNE WILSON Captain, MC USN of Philadelphia Pennsylvania assigned to U S Naval Hospital St Albans New York graduated in 1928 from Hahnemann Medical College and Hospital of Philadelphia appointed a lieutenant commander in the United States Naval Reserve 16 April 1942 reported for active duty 20 April 1942 commissioned a commander in the United States Navy 5 July 1946 died 7 September 1959 aged 57 at U S Naval Hospital St Albans of intrapulmonary hemorrhage

MATTHEWS NORMAN CALVIN Captain DC USAR, of Nashville Tennessee assigned to U S Army Hospital Fort Sill Oklahoma graduated in 1936 from Meharry Medical College School of Dentistry Nashville appointed a first lieutenant in the Army of the United States 6 June 1946 reported for active duty 3 July 1946 died 10 August 1959 aged 39 at Brooke Army Hospital Fort Sam Houston Texas of pulmonary carcinoma

RAINES GEORGE NEELY Captain MC USN of Jackson Mississippi last assigned at the U S Naval Hospital Bethesda Maryland graduated in 1931 from Northwestern University Medical School Chicago Illinois commissioned a lieutenant (j g) in the United States Navy 26 June 1930 reported for active duty 26 June 1930 retired for physical disability 1 May 1959 died 16 September 1959 at the U S Naval Hospital Bethesda of bronchogenic carcinoma

RING DEAN MERRILL, Major USAF MC of Cedar Rapids Iowa last assigned to the USAF Hospital Chanute Air Force Base Illinois graduated in 1951 from State University of Iowa College of Medicine Iowa City served in enlisted status United States Naval Reserve 17 April 1944 to 10 February 1947 appointed an ensign in the United States Naval Reserve 11 February 1947 resigned 20 February 1949 appointed a second lieutenant in the Air Force Reserve 3 April 1950 reported for active duty 14 June 1950 released from active duty 10 September 1950 returned to active duty 2 July 1951 commissioned a first lieutenant in the United States Air Force 15 March 1953 retired for physical disability 17 June 1959 died 17 September 1959 aged 33 at the USAF Hospital Chanute Air Force Base of leukemia

WAGNER ROBERT LOWELL Captain MC USN of San Francisco California assigned to U S Naval Hospital San Diego California graduated in 1933 from McGill University Faculty of Medicine Montreal Canada appointed a lieutenant (j g) in the United States Naval Reserve April 1938 reported for active duty 17 February 1941 commissioned a lieutenant in the United States Navy 5 July 1946 died 7 September 1959 aged 51 at U S Naval Hospital San Diego of aplastic anemia

Book Reviews

MEDICAL DEPARTMENT OF THE UNITED STATES ARMY IN WORLD WAR II Neurology Volume I Edited by Colonel John B. Hayd Colonel Joseph C. Hinsey MC USA Edited for the Surgeon General Major General Raymond W. Bliss MD and Major Albert E. Sobel MC USA Assistant Editor Pp. xvi + 466 with 146 illustrations Washington D.C. Department of the Army Office of the Surgeon General Department of the Army Washington D.C. 1956 Superintendent of Documents U.S. Government Printing Office Washington D.C. Price $

This first of a series on neurology in World War II begins with detailed descriptions of the organization of the Army Medical Service and the evacuation of casualties from the battlefield. The major portion of the book is devoted to the problem of head injuries with emphasis on the rehabilitation of patients with disabilities resulting from injuries to the brain. The methods of treatment of these patients at the Army Specialty Center at Percy Jones General Hospital in Battle Creek Michigan are described in detail. The Center was established in January 1944 and by the end of the war had a capacity of 1000 beds. Problems of rehabilitation of patients with disabilities of the brain are complex and require the services of many specialists in medical and social fields. Especially useful are the descriptions of the methods of testing and training patients with disturbances of speech and of the vocational training of patients who cannot return to their former occupations. The book is well illustrated with photographs and diagrams.

The chapter on the organization of the Army Medical Service in World War II is of great interest to those who are concerned with the problems of military medicine. The author describes the evacuation of casualties from the battlefield to the rear areas and the establishment of hospitals in the zone of the interior. The chapter on the evacuation of casualties from the battlefield is of great interest to those who are concerned with the problems of military medicine. The author describes the evacuation of casualties from the battlefield to the rear areas and the establishment of hospitals in the zone of the interior. The chapter on the evacuation of casualties from the battlefield is of great interest to those who are concerned with the problems of military medicine. The author describes the evacuation of casualties from the battlefield to the rear areas and the establishment of hospitals in the zone of the interior.

Important statistics are presented on the number of patients with head injuries admitted to the Army Specialty Center at Percy Jones General Hospital in Battle Creek Michigan. The author describes the evacuation of casualties from the battlefield to the rear areas and the establishment of hospitals in the zone of the interior. The chapter on the evacuation of casualties from the battlefield is of great interest to those who are concerned with the problems of military medicine. The author describes the evacuation of casualties from the battlefield to the rear areas and the establishment of hospitals in the zone of the interior.

study of 24 patients who survived from 30 minutes to 10 days after wounding The equence of changes is as follows Within a few hours after the initial lac eration and hemorrhage a preading thrombo is and necrosis occur which l then followed by infiltration of white cells and activity of glia by 18 hours After the econd day demyelinization was apparent after the third day gitter cells made their appearance after the fourth day capillary proliferation wa seen Multiple brain lesions were the rule 18 of the 24 patient al o having ventricular wound It is pointed out however that except for obviou injurie involving the brain tem one cannot jud e the outcome of a ca e solely on the distribution of the apparent lesions The intangibles are too great and the decision regarding operability of any one patient will ultimately depend on the interplay between one clinical estimate and the realization that many ca es are waiting to be done There is an appendix with practical point on the management of variou type of injurie The volun e tand as a tribute t tho e who took part in haping it

MAJ HAROLD ROSEGAY IC USA

TOTAL SURGICAL MANAGEMENT by *James D Hardy* MS MD FACS Modern Surgical Monograph Editor in chief *F S Fulton* MD Consulting editor *Richard H Orr* MD 29 pages illu trated Crune & Stratton Inc New York NY 19 9 Price $9 0

This is a rather unique book written by the profes or of urgery at the new and vigorous medical chool of the Univer ity of Mi i ippi In his preface the author tate that the book is intended primarily for the general surgical practitioner However it would eem to be an ideal bo k for the urgical in tern and re ident because it contains information not u ually found in text books but handed down by word of mouth It di cu e uch question a how to talk to a patient and his family what factors t con ider in judging whether a patient can with tand the contemplated urgery what are normal value ho to calculate fluid and electrolyte requirement ow to perform venipuncture in difficult ca es ho much i the probable blood lo at different operation the cau e and treatment of hock how to write preoperative and postoperative orders and the rational behind the orders when and ho to carry out various diagno tic and therapeutic pr edure ow to examine and diagno e the acute abdomen, ho w to set up and care for uch apparatu a the Seng taken tube Levin tube or duodenal fi tula uction, ho w to give and withdraw corti one after urgery and many other very practical point that a e hard to find di cu ed in the detailed written form The e a e que ti n that a young urgeon will frequently want to a k the profes when he i suddenly faced with the problem This book i highly reco mended for all h pital medical libraries particularly thos h spital which train intern and resident

LT COL ROBERT M HALLAWAY MC USA

PROGRESS IN PSYCHOTHERAPY Volume IV Social Psychotherapy edited by *Jules H Masserman* MD and *J L Moreno* MD 61 page Grune & Stratton Inc New York NY 19 9 Price $8 7

This annual review of psychotherapy the fourth in a series [illegible] of the best paper on the subject published during the previous [illegible] some special articles by the editor the Inc[illegible] arti le on psychotherapy in vari u parts of the world [illegible] the right seem a little bull t the average reader if h [illegible] that are ably written titut a useful additi n t the [illegible]

The book is valuabl umm rizing and p ese ti g as it does th vario pini n. f num u auth i y h th py pecialty which i till far from bei g n ien nd b t hi h i any e till incli ed t be d gmatic It i n t a look th t houl l att mpt t re d f t co r b t th o f m whi h t lect a occa io l ti l f tim t time l pendi g l t r t at th n me t It i highly recou n ded t ll th i t ested i the ıl ı bl m f psy h th aı y

L COL JAY F TUTTLE MC USA

STRONG AN EL Y S HUMA NEUR Y by *R y d C T cx* 4th edit 11 pages illu trated William & Wilki C B lti e Md 19 0 P ice $10 R vi i n f thi t nd rd t tb k f neur nat my ha been ll lon The n hi t logi po ti tin t l cl i M t f the fi l av i g nd ill t ti of ı e i u editi n ı r ed i the pr se t M j ha ges in a haıte fil t t f the pi l o d ılu th additi n f l red d ag am f n p tl w y h p oduce l a pop l f ti l pp h Th n t i l gi eem p i rily d ligned f medi l t d t h need soli i l a f t mic k wledge Th e i little flection f rre t a cl the li l i y t eve th gh the hi cephal n d lf t ry p th y h cl aıt t t Th book h uld ti fy th wh i additi t f d m tal te tbook desi e f ly omı he i k ledge f the structu f th rr ı y t m

L COL ARTHUR J LEVEN S C U A

P YCI OLOGY O PER NAL TY dited by *J L M C ry* Ph D with six co tribu t rs 383 p ges C P es I N w Y rk N Y 19 9 Price $1 9

Thi b k i an tg wth f th l lect ries in ps h logy h ld t th Univ ity f H t Th e ies i l ded vmpo i m l pe ality by ix l d l th field—I eop l l B ll k R ym l B C tt ll Georg S Kl l David C M Cl ll d Ma g t M d a d N itt S nf d F ch auth ha p e ted hi po iti i g t rmi l gy d rga i ti best ited t hi wn theo ti al app ch Th h pt e d w ll rga i ed Th m teri l p e- ted i f peri qu lity Th po t f i w p es nted by th diff e t uth t fo th in a lu t l nd int esting tyl nd th uniqu n f ch f th theories ı ted c n b ily g a ped F h secti f mat ri l i t m t lly t f rth with app ıri t t p h di a d th chart d graph gi l tyl whi h l nd ea y t i terp t. Ther i an mpl b bliography Th l m will ppeal t the l m ted gr p of ders b t b ll ec ded a b i efe c f psy h l gi ts. It ill ı bably erv celle t b kgr nd t ri l f ı v hiatri t d ocial k rs

T COL WENDELL R WILKIN MSC U A

I DU IAL C RCI OG by *R F F A dt* M D Ph D F A C P 164 p ge illu t ted Grun N St tt n I c N Y k N Y 19 9 P $6 0

Thi ll l ı ides ll t l t od ti n t th bject f l t i l g I hai t th th d es th h t ic l a pect f ·c ı t l a pe i e tal a i ge occ ı ti l ca e f th i u g y tem p tecti e oc pati n l h lth p og m medic l gal o id t l la tly hi look i t the f t With ut m i l l g th l ı t f l b t ry fi ll g i th fi ld f p rim t l c i g esi t i pol ted t that k wledge f occ p ti n l ce h om f m the ob rv

tions made by physicians on human beings suffering from cancer Of the reported cases of occupational cancer approximately 7 percent have been of the skin 1 percent of the bladder and the remaining 10 percent have involved bone lung sinuses and larynx Reported agents and processes associated with industrial cancer include coal tar shale oil arsenic ionizing radiation ultraviolet radiation aromatic amines radium chromate production nickel refining saltpeter mining asbestos production and isopropyl alcohol manufacture The chapters on industrial carcinogens and protective programs are practical and specific Although this book concerns industrial cancers one can learn much about the principles and practice of occupational medicine from it The bibliography is up-to-date and satisfying This reviewer believes that the author has attained his objective of putting the problem of industrial cancer in its proper perspective from a practical standpoint This monograph is recommended for medical students industrial physicians and practitioners who have industrial workers among their patient

LT COL CHARLES W KRAUL, MC USA

VASCULAR SPIDERS and Related Lesions of the Skin by *William Bennett Bean* MD 3 2 pages illustrated Charles C Thomas Publisher Springfield Ill 1959 Price $8 50

The author of this book is a well known teacher investigator and critic He presents a compilation of material designed to offer a better understanding of disturbances of cutaneous blood vessels His articulate thoughtful philosophical attributes show him to be as always, the medical nonconformist par excellence The result is an exciting parade of diseases of small vessels and large common and rare in most of which the skin is involved The volume is a treasure-house of information derived from the author s own observations and from the literature (nearly a thousand references are listed) The subject of vascular spiders and palmar erythema occupies the first third of the book From there he goes on to examine in meticulous detail almost every conceivable anomaly of the cutaneous vasculature He delineates from time to time as the fancy strikes him to encompass diseases not primarily in the boundaries of his subject—for instance pellagra Cushing syndrome nail dystrophies and facial hernias All this makes for thoroughly enjoyable reading Many fields besides internal medicine and dermatology are included in his wide range of interest and knowledge The dermatologist particularly should appreciate the technics and dynamic approaches of this morphologically minded physician who would restore the role of observation to its erstwhile pre-eminence as the useful tool of the clinician He answers innumerable questions many from data personally recorded at the ward one by hypotheses and speculations formulated from years of thought devoted to the material His writing is unlabored direct lucid and free of circumlocution The book can be recommended unreservedly to physicians in every field of medicine

COL ALLEN D SMITH USAF MC

MATERNITY A Guide to Prospective Motherhood by *Frederick H Goodrich Jr* MD 130 pages illustrated Prentice-Hall Inc Englewood N J 1959 Price $1 75

This inexpensive pocket maternity guide not only presents the course of pregnancy in an orderly manner but also points out possible complications in an unalarming way It discusses briefly but thoroughly common complaints

and p blem the pr n t l pati t expe i e an l e plain the nece a y p ced r s fo p e atal e Th e is an ellent hapter f pectant f th an lly und tood dietary and eight ppendi and it i ell ind ed The au th ha kilif lly a id d y c tro rsi l ubject of p enatal c e Thi b k h uld l e f imm n e v l e b th f m th t dpoi t f educating ati nt nd dec easing th ti pe t by the bu y phy i an i bri gi g o t thes poi t in l terv l

COL. HAR L E. HA ISON MC USA

I RACT C L O L S R RY by *Hen y B Cl k J* MD DDS d editi th roughly re i ed 60 pages ill t ated Lea & Febiger Philadelph Pa 19 9 Price $9 0

Thi cell t publi ti h ill ha id rable appe l t th peci lity tu l rt f ral su gery nd t the p acticing al u g on It eak st poi t i hardly w th r ti i g it appe in th refa th a thor pu po e that thi b k be c ci e t t f stude t and ge ral p actiti er Q ite lik ly th m de t ljecti i t r li ed ept p h in loc l ea Ac tually the m t rial i ffecti ly a d th ghly p e ted n a le l seemingly b th t f th de g ad t t d t Tl ere a e xcell t chapt o in trum tati in o l ge y do tia tech ic (ll ppo ted with di g mm ti k t hi g) d an l ti f cu r t d ug d pha mac uti ls that will b f i t t t th bu y g ne l p ctiti n B t th v ry h t f the b k d al ith ubject lik ( ) medi l co dit f in po ta in al g y (b) c l gy (c) c ecti u g ry f d f miti such l ft lips nd pal tes ma dibul p ogn thi m nd et u i n (d) f tures f f al b ( ) f lmi ti g fecti f b a d ft ti (f) d t l p bl m i l l g th ma illa y in a l (g) hospit l p a ti Th a e aj l urgi l p bl m a ly m n g d by d g d t tud t and mmonly f ed l he l y bu y g l p titi e v th l th t t l sid d dest bl dd t o t th de tal lit atu itte by th wh i pabl q alified pe i ced a d ffecti a t h r It is rec m mended t ll d s f d nt l lit tur despite it wh lmi g app l to th o al g th th n t th t d t a d g eral ct t

CAPT THEO RE A. LESNEY DC USN

MODERN TRE D I DI EA S TH V RTEB L Co u v dite l by *R g al l Vas m* BM FRCP d *H J ck o B rr s* MD FRCS FRACS ith 1 co t ib t 303 pag ill t ted Paul B Hoebe Inc V w Y k V Y 19 9 P ic $15

Thi i n xcelle t y po i of co i ticle n t of the ig ifi t ffe ti n f the pi e t ib ted by 1 t t di g B itl h th pedi t di logist eu u g n p th l gi t a d at t t Th a i t d t y di u i f 30 pag f th e b y l gi l dev l n t of th spine nd ub eq e t id ls f lie Th ph t g aph d wi g a d tgen graphi p l cti n a ll e ti e t nd of g d q lity The book f rm t d g i ti a tt n ti d l gi al d th ticles d eas ly On of it tt ti f tu i th t it i urp i ingly th n an l p table f all its mp h i t t Th lu p id a l k i of tial of m j l e t f th tel l ol m d ld l e pe i lly al bl to ide t th p d g y d a ad safe f e f all geon

C PT WALTER R. ILLER, V USN

DIFFERENTIAL TREATMENT AND PROGNOSIS IN SCHIZOPHRENIA by *Robert D Wirt* Ph D and *Werner Simon* M D with six contributors 198 page Charles C Thomas, Publisher Springfield Ill 19 9 Price $6 50

This authoritative study describes primarily a carefully controlled investigation of chlorpromazine and reserpine in comparison with each other and with traditional treatments such as electroshock insulin coma and psychotherapy The patients selected were first admission with no history of previous treatment for schizophrenia and with no prior tranquillizing medication The results suggest that those treatments including tranquillizing drugs which after careful diagnostic study are specifically prescribed for the unique needs of the individual patient are the best treatments The authors consider it premature to discard such treatments as insulin coma electroshock and psychotherapy in favor of the tranquillizing drugs Beyond this their results indicate that chlorpromazine (a relatively inexpensive and easily administered form of treatment) does almost as much good for the short term relief of symptoms as do the more intensive and complex therapies In the 30 day period reserpine had little more beneficial effect than hospitalization alone The discharge data after the 30 days evaluation period indicate that all of the patients who received intensive psychotherapy were in the improved discharge group and all the patients who refused treatment were in the unimproved discharge group Those receiving psychotherapy were of course those selected as good therapeutic risks for this treatment At might be expected the adjustment of the patients one year after discharge was more often unsatisfactory than not less than ten percent could be rated as showing no symptoms of the type for which they were hospitalized about one third of the patients were rated as clearly improved the rest were not improved over 40 percent requiring further care at home or in mental institutions This volume is an excellent guide to those physicians psychologists social workers and others interested in worthwhile psychopharmacological research and should certainly be carefully perused

COL PHILLIP B SMITH MC USA

THE ESSENTIALS OF ROENTGEN INTERPRETATION by *Lester W Paul* M D and *John H Juhl* M D 839 pages illustrated Paul B Hoeber Inc Medical Book Department of Harper & Brothers New York N Y 19 9 Price $

This book whose title accurately reflects the scope of its subject matter fulfills the purpose of the author who aimed to prepare a textbook for medical students and a source of reference for practicing physicians and surgeons Written in a clear and concise style this work avoids the extremes of brevity of an elementary text and the minutely detailed phraseology of the multivolumed set The six sections deal with the osseous system the brain and spinal cord the abdomen and gastrointestinal tract the urinary and female genital tract the chest and the face mouth and jaw The logically organized text supplemented by 1 903 illustrations all of excellent quality permits the reader to obtain a clear understanding of the great number of conditions encountered in roentgenologic diagnosis In addition to the radiologic features of these disorders pertinent clinical and pathologic information is included to make a well rounded tinely discussion of most of the more common items of interest to the radiologist The various special methods of examination in

and l ble the p at l pati nt exp i nce a d plai s the neces ary pr ced res for p e atal r Th is an x ell t chapte f r e pect nt father an a ily under-tood dietary nd w ight appendix d it l well l de ed The a th r h kllif lly id d ny c nt e ial bjects f t l care This b k h ld p f imm e val b th f m the tandpoi t f educating ati nt l dec asi g th time pe t by th b y phy i ia i bri ging o t the pol t in l t rvi w

COL H O D E. HA RISON MC USA

I R CTIC L ORA SLR EBY by *He y B Cl k Jr* M.D D D S 2d editi th ghly evi ed 69 pages illu t ted I ea & Febiger Phil delphia Pa 10 9 Pri $9.50

Thi e cell nt p bli ati h ld ha id able appeal t the pecialty t d t of l u g y nd t th p ctici g al u g on It we ke t point i hardly w th m nti i g it appe in th j efa the auth s p po e that thi b k b conci t t f stude t and ge e al p actition r Quit likely thi m de t bjecti i n t e li ed cept perha in local ar A tu lly the m t ri l i ffecti ly a d th o ghly p e ted n le el se mi gly b e th t f th u d g ad t tud t Tl e ar ex ellent chapter i trum t ti i l g y e d tia tech i (w ll upp rt d ith di gramm ti sk tchi g) a d e alu ti f cu t l ugs an l pharmace tic ls th t ill b f i t t t th b y ge l p a titi e B t tl e y hea t f the b k d l ith bject lik (a) m di al co liti f i po tan i l su g y (b) n l gy ( ) ti g y f i fo itie u h cleft lip and p l t m u ih la p gnathi m and t u i n (i) f ctu f fa ial b n (e) f lmi t g i fecti f b d ft ti s (f) l t l bl m i l i g th m ill y i d (g) hospit l p a ti The e maj l u gi l p bl m ly m g d by u d rg d t st d t a d mm ly f rred l h ky bu y g ner l pr ctition Neverth l the t t i id d desirabl add t n t th d tai lit tu itten by n a th wh i p bl q lified peri ed a d ffecti a t a her It i recom m ded t ll d f d t l lit t despit it h lmi g app l t the l g rath th t th st d t nd g e l p tition

CAPT THEO ORE A. LESN Y DC U N

Mo BN TR DS D EASES IE NE T AL COLUM dited by *Reg ll* N BM FRCP a d *H J Ko B o* MD FRCS FRACS ith 15 t ib t 303 p g ll t ated P l B H ber I c New k N Y 19 9 Price $1

Thi l an xcell t ympo m f co i ti l t of the ig ifi a t affectio f the p e co t ib ted by 1 t t di g B iti h th pedi t di logi t geo path l g t d n t i t Th e is a l t od t y di i f 30 p ges f th mb l g l d l pn e t f the in d ub eq ent id al f a m l Th h t g h d wi g and tge graphi d t a all p t t a d f g l qualit The b k f mat d ga t a tt cti d l gi l and the articl ad easily O f it tt t f t th t t i u i i gly thin n l table f r ll it comp h i t t Th lum pr id ick re i f ti l of m j i l t f th t b l lu n d ld be e peci lly aluable t e id t i th p di g y a d a eady f r fe e f r all geo

PT WALTER R. MILLE MC USN

MAMMALS OF NORTH AMERICA, Volumes I and II by *Raymond Hal* Ph. D and *Keith P Kelson* Ph. D 1083 pages illustrated Ronald Press, New York NY 1959 Price $35.

These two volumes provide an annotated list of the orders, families, genera species, and subspecies of mammal that have been described from the North American continent as far south as Panama and from the adjacent seas All taxonomic names are listed very carefully together with the appropriate source Also very complete locality record have been assembled from the literature and used to construct distributional maps of all the species and subspecies which are recognized as valid by the author There are keys for identification of major and minor groups, but these are not very clear and often simply based on localities These are useful if at all only to the specialist There are few good descriptions of external characters like and color and these are not sufficiently supported by the quality of the illustrations Biologic data are few and sketchy This book may be used for quick orientation and can be useful in the hands of the critical and trained observer although it is principally based on Miller and Kellogg *List of North American Mammals* itself admittedly a compilation It cannot be recommended to the epidemiologist The distributional maps not being based on original critical revision of groups which one would expect in such a pretentious and expensive work are unreliable For simple identification of species a number of excellent field books are available some of these are far more practical than this work

COL WARREN C STEARNS MSC USA

A SYNOPSIS OF PHARMACOLOGY With Special Application to Dentistry by *Eric G Sutherland* Ph D 407 pages illustrated W B Saunders Co Philadelphia Pa 1959 Price $4

This is a new publication in the field of pharmacology prepared to meet the needs of students taking an introductory course in pharmacology The book is well organized according to the therapeutic action of drugs The author has been forced to be dogmatic in his presentation because of the compact nature of the book However the contents are accurate and quite adequate for the purpose for which the book was written The illustrations have been well chosen to point out the more important theoretic principles involved in an understanding of drug action For example the chapter on the autonomic nervous system is especially well written and illustrated and would serve as an excellent quick review of the latest thinking in autonomic pharmacology The compactness and the outline style of the book necessarily limit its usefulness somewhat however the more advanced student and practitioner will find it valuable as a general review

MAJ ROY E MUNLY MSC USA

INTRACRANIAL CALCIFICATION by *Jerre Mandeville* and *Vincent Valentine* 110 pages illustrated Charles C Thomas Publisher Springfield Ill 1959 Price $9.50

This is a mongraph on normal and pathologic intracranial calcification as seen on plain films of the skull The discussion of normal calcification is very inclusive and numerous illustrations demonstrate site and radiographic appearance of this condition It is the author's contention that calcium can be selectively and characteristically deposited in parasellar inflammatory

gra ulo at a ul l g n rati l doc i di t lance Numer u illu t ati n f the i ı ll e that ı l thi abn r al cal ific ti are ı res ted The au th h t n l lv o ı a d th ir fin ll g ith th vailable literatu e n th ı ject t l t t h w accu at ll g i con le n the la i f b r l c l ifi ti n Th ill t ati ı r l ced i th book are dra fr ıı th e e te i e ll ted ver a pe i l f m nv year The au th freel relat tl ei fi ll g d conclu i n with th f th rs Th are fr k a l c el i th i greei e t ı ith r c iti i of th interı retati ı e i ı ly ı re ted l y tl w ke in thi fi l l Th y hav a le e ery att ı t t loc t th i con lu i l y ill t tion ch rt a l t t Si ce thi l k i t ed ainlv ı po th pe i ce a l ra li gr ı hic fil th t th tl hav available t the it i t t be e pected that type f ı ath l gi int a ranial calcific ti n ld be pre e ted i thi k H ve ith fe ce ı ti the j ity f the proce p d i g i tra a inl alcificati r f lu ted Si ce there a few bo k d li g with i t ani l ca l ifi ti n itt i th E gli h langu g nd i ce th litt atu thi bject l id ly li persed in sep rat arti le thi book i ll nt so ce f ref e ce f th bject An exte i bibliograı hy f Eu pe d \ i s ce l in l d i The bo k was itt n n i l f n l g t n geo a d radi l gi t but it ld b w ll f ll medi al ı a titi wh h t i ı l in film f tl kull t i tl ell t ecti ı itl l gi t tri a lal calcificati n

T D AR A SHELDON U DC

I nysi oc C ı St y Hypoth rmi I t co ps al Ci ul ti d F tr po l Cooli g l F A G H M D 96 pag Ch l C Th ma I ı bli h r Sp i gfi l l Ill 19 9 I ic $4 0

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COMDR. A C HERIN IC US

THE MANAGEMENT OF ORAL DISEASE A Treati e on the Recognition, Identificatio n and Treatment of Di ea e of the Oral Region by *Jo eph I Bernier* D D S., M S Colonel DC U SA 2d edition pages illu trated C V Mo by Co St Loui Mo 19 0 Price $1

This book goe far in re olving ome of the fru tration of the clinician who treats oral ti ue The e inclu le the clinical imilarity of many oral lesions the frequent di imilar appearance of dermatolo ic-like lesion of the mouth and their counterpart on kin and particularly the ut tle differences between oral and general patholo y For oral pathol gy deal almo t exclu ively with living tissue while general pathol y deal more with both living an l dead Accordin ly the author present oral patholo y a it concern the e living ti sues in their pecialized area including appro riate o mparison Thi do es not mean that diagnosis, with it limited a plicati n, which u ually con i t of a photogra hic type of identification i hi goal He prefers "management" for its broader imp lication of rec ognition identificati n, and treatment Thu we hould recognize disease throu h it eti ology ti ue change and evaluation of the patient We may identify it by clinical a pearance hi t pathology and laboratory findin s And only then may we lo ically direct treatment Di ea e is a proce rather than an irrevocable plight and therefore amenable t management The text achieves that rare desirable quality of being factually complete a a reference without a u ele filigree of inco n equential minutiae from ages pa t All the tandard entities are excellently gr uped and covered with the added easoning of refreshing comment ba ed on a lifetime of devoted effort and unique personal experience With uch management there can be no question of propriety in includin a chapter or two on fundamental The Interpretation of Si ns and Symptom i a beautiful exp lition of analytic evaluation of the patient, from his subjective pain through laboratory pro edures biop y and the general adaptation yndrome So mooth i the flo w of thou ht throughout that even proofreader were carried awa y For a summary Colonel Bernier comment eem appro riate To eliminate ymptom without having e tabli hed the nature of the di ea e process which ha produced them is never the correct approach to therapy

LT COL. JULES D KARTMAN USAF DC

CLINICAL DERMATOLOGY for Students and I ractitioner by *Harry M Robinson Jr* B S M D and *Raymond C V Robinso* B S M D M Sc (Med) with 6 collaborator 2 2 page illu trated Williams & Wilkins Co Baltimore Md 19 9 Price $8 0

The auth r Dr Harry M Robin on Jr and Raymond C V Robinson are well kno n to all intere ted in dermatology Both are a ociated with the Uni ersity of Maryland Scho l of Medicine Dr Harry M Rob in on Jr being head of the division of dermatol gy Morph l gic dermat logy has been taught with con iderable success for many year at the I niver ity of Maryland and it i gratifying that publication of thi meth d has bec me a reality The more com mon dermato es are discus ed and suggestion made c ncerning treatment The text i divided into two parts I art I titled General Considerations, e gins with anatomy of the kin I ri fly di cu ing all phase of dermatolo y Part II Mor hologic Dermat logy presents a l gical a proach to the mor common cutane us pr l ems Through ut the t xt the auth rs empha ize the neces ity for a c mplete hi t ry and hy ical examinati n plus the u e of labo ratory finding to confirm th clini al diagnosi The kin i des ribed as the

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CAPT W M SILLI HA AC U N

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Di ea es Metabol sm Detailed M thod of D agnos a d Tr tm nt edited b *G fi ld G D ca* M D with 22 c t ibut s 4th edit n 1 104 pages illu t te l W B Sa le C I h l lel bl I 19 9 1 ce $18 0

Th fo th editi n f thi eli bl work ep esent a fi th imp eu t v r p e i u editi d i di ates th g g n t f thi ubject The l es nt v lu e i u uall pl te with espe t t h i e f bje t i att ith pe haj peci l pha i b h d te m tal li With espect t th l tt the t tan li nt b ti b D R ch iel Le i v ith pa arat rti l by D D n on d bete m llitu d po t eou hypoglycem Dr Pri cill White ju enil di betes a d D Ab aham Canta on elituma Ther e ell nt ntribut by Dr L W lt wat b la ce i h alth d li a an l i li tab li by D Ab ha C t i dditi n t th it ti i f th ubject f it mi a d avit in es b D T D Sp ie d hi gr j u l t trit by D Ancel K y po phyrin t b li b D Cecil W t n and g t by D W lt r Ba d F Ca lkin Special tte ti gi t li e f the th id d d e f th k d ey w ll a the pected bject f be ity fat a d p te n t b li m The e num u ill t t o und figu e nd th bibli g aphy i c pl t d p t date If ny it w t) be d ected at thi lum it i ht be th t th i too n ch mj h i ca b hyd t tab li a d di betes pec heally d th t pe hap d u ight h e bee d te l t id ati f e t i b r f et b l h it ble li de f t ti hi h ight be n m t b l b i Th p nt v l rthwhile co t ib ti t c t l t at n thi bject a d l e j t it j l e i th bt tl f pr idi g d t il d ethod f d g i d t tt e t Th k f mp bl p it tly a l ble thi bject

CAPT AUL J SCH MC U A (RET)

St y S AC t Dt ust by *Cl dc F W l l* M D D Sc (H) 3d ed t vi ed 40 p g ill trated Y B k l bli b In Chi g Ill 19 9 P e $9

Th third diti n f thi h dt k i li ded int 3 c e d h t ecti Th fi t fi ect r d ted t a t m a h rt b t i l umm y p e- d post pe ti treatme t speci lized i trum ts d th v io i o u d Th l t tl ee take p d e f th t a h l od al fi t la d h h ge d t po t l hype t i n Oth ecti r d ted t d pt f pe t a d in i t t l t t t t f i di ti d j os ibl i jl ti j i l D u i i li ted a d al t enti l tech i l i at Y att mjt i m de t discu diagnos pl y logy path l ~y Th i not a textbook of u gery b t i i e d f f i pe at ly p f d n th t h a d d d The i l b al u f illu t ati all ll d n h h help t cla ify th t t f th e t ti ely fa illiar with th specifi p oced e d di i n A table f m l l b at y l f bl d d g t c l t i l ded in Appe d 1 nd t Ple p t pe ti di t j ted Appe d II Tl b bl g ph i adeq te a d th l a i ll de ed T th y g p i titi n th ha db k h uld j t be l bl j k ef on tech ic F det il f nv pecifi pe at n tl igi l t les a be l tified f th bibli graphy

RI Y CLI TON YTER, MC US

SURGERY OF THE PROSTATE by *Henry H. Reinhoff, M.D.* [illegible] pp., illustrated by *Halcyon Harris Cook* and *Hally Power*. W. B. Saunders Co., Philadelphia, Pa., 1949. Price $7.

This volume provides a detailed discussion of the currently accepted standard prostate operations as well as a representative selection of valuable alternative techniques. Emphasis is placed on the safe use of the procedures and the pitfalls of others while showing that some techniques are unsatisfactory under some circumstances yet valuable under others. An interesting historical review of prostatic surgery includes the development of each of the four accepted approaches as well as a résumé of the various methods that have become obsolete. Preoperative care is very well covered and includes criteria indicating when adequate preparation has been completed; equally well done is the chapter on postoperative care and management of complications. One chapter covers the choice of operation to fit the problem at hand. Of special interest is the presentation of the problems encountered by the anesthetist, the appreciation of which makes the urologist better able to perform the operation and evaluate the influence of the anesthesia on the postoperative course. In addition the potential postoperative effects of complicating medical conditions are discussed.

Much of this new text is actually an atlas of surgery. The numerous illustrations of surgical techniques are unusually clear and accurate in detail.

The practical application of high frequency currents is clearly presented. The modern concept of micturition and cause of urinary incontinence are covered in some detail. One chapter beautifully illustrated in color, is devoted to surgical pathology; another chapter deals with the surgical anatomy of the prostate and includes a reminder of the fact that the prostate contains striated muscle. The differentiation between benign prostatic hypertrophy and prostatic carcinoma is lucidly presented. One most interesting and thought provoking chapter deals with the future of prostatic surgery. The book is an excellent handling guide for the urologist to all standard procedures for the surgical management of prostatic diseases. It is filled with those subtle refinements in technique and supportive care that can mean success or failure in prostatectomy. I can enthusiastically recommend it as a valuable and cost handling addition to every medical library and particularly to the personal library of urological residents and other trainees in surgery as well as the older changed in the practice of urology.

[illegible] MANFRED MC[illegible]

SURGICAL PATHOLOGY by *Lucien A. Aegerter*, M.D., in collaboration with *Harry B. Hutchins*, M.D. Second edition, 1000 pages, illustrated. C. V. Mosby Co., St. Louis, Mo., 1949. Price $[illegible].

The second edition of this work is unique in that it represents collaboration between the pathologist and the surgeon. Dr. Harry B. Hutchins, associate professor of surgery at Washington University, has contributed to the organization and editing of the text. The 6 chapters and 1111 illustrations afford a comprehensive review of surgical pathology. The [illegible] chapters, which are excellent, the clinicopathological correlation of each entity [illegible] extremely helpful in the pathologic training [illegible] a very quickly get an excellent review of all facets of particular tumors or [illegible]. Most of the illustrations suffer from the lack of sharp detail. [illegible] small detail [illegible] the overall excellence of the work. [illegible] the pathologist and the surgeon.

[illegible] FRANK M. [illegible]

TE T OOK M B LOGY by W *H B rr c* Ph D ith the llab ti *f R h d Ja Porter* Ph D l *J s W H Mo ld* Ph D 17th editi n 9 4 p g ill t t d W B Sa de C Phil lelphia I 19 9 P i $14

In thi th f n l l gth m n graph a text th t ceed in encom l ll f ba l pplied i bi l gy w th it u bi g t the t g e f t li i table e pecially in th 17tl ed ti n f ti e- h n ed w k The rang f thi t xt i i l i e that it uff by nec ity f m l k f d tail Fo exa pl m tion i le f g -l limiti g i ci l react i th te ic ba teria ecti Th i i ti ly f id ti f *Mi e H llca (B t t*) gani i l p g beca e these b te ia ece tly bec i g recogni ed a hum n ath g Th haite n edi al it l gy i b ef b t i cl i co ide ation of all th i o tant it Detailed d c ip tio d dia n ti meth d mi i g but fe ce re lequ t The my l gy ll t ti e i fe i t th ph t graph a d the co f gal co t i a t re ig ed The h pt o cer ed w th iru d v l li a i cell t f the tu lent desi ing n int odu ti n to th ba i t f irol gy litho gh tech ics f di g agai ha bee o itted A t i u le irabl l gmati i e id ed in th ect n by th auth n lenyi g th po bility th t c t crat h f e c uld be f l ig n Tl i f l t est t th i wh ith l t tly po t l p g f l gl ti i f th g nt i egg Thi t t ain f th fi e t a l bl h w d i ia ticul ly comm d d f hy i a Th f da t l m d th f micr b l gy e i l ded d i ted i a ry i il n l t de tind bl fa hi

C L CHA S D GRA MSC USA

M T n F I N B E N J T S Y by *Cha l s O ll B l t l* M D *4lb t B tt F g l* M D d *l t cl Go L g* B S F R C S 186 i g illu t ated Willia & Wilki C B ltim e Md 19 9 P i $8

Th mo g ph ffers n l t esti pe d f th bi logi l e gi ee l g i n ii le i l ed in th econ tr cti n f the k l t l y t m T ch th i p rp se th th killfi lly i re e t a é é f the k in thi fi ld i c l an l dd th re lt f th w y e t l l i led research l t th tall rgic an l e gineeri g p obl t red Th f rm t nd ill t ati are elle t l the t t i l ly writt I cl d l is an gi eeri g rth ped gl y that will be h lpf l to thos e en le wh ha n t been p ly expos l t th e gi ee i tern ed th te t. Thi book f llow th tre d t the n en i g int d pen l nce f the bi l gi n l rhy i l i nces With it th orth pedic t geo can beco e v sed l th f dament l f m t ll gy d gi eeri g ece ary t pra tice h pecialty The book is n t all i l i a d t ally appea t be a h t i co pl t i th t less tha tw pag re d ted t i tram d ll y fi ati f b n d n ti n i le f th ew pla ti int rn l fi t at rial b i de el ped N rthe- les th th r h n d a v y i porta t co trib t to surg ry of b e d thi v l e hould b o id red equi ed readi g f r yo co cerned ith th t at nt f f act e r e o tructi n of th keletal y t It i highly ec m ded f incl i i th llbrarie f i t t ti offe i g e l l y t i g i rg ry nd rth ped es

CAP H B A ARK ITZ C USN

SQUINT AND ALLIED CONDITIONS by *George P Guibor* M D , D D S 2 6 pages Illustrated Grune & Stratton New York N Y 1 9 Price $11 0

The author has written a book on squint which is a summary of his observations and experiences gained from his study of over 41,00 patients during the last years The book is not large easy to read and covers the subject very well The discussions of the methods of examination and treatment should be of particular interest to ophthalmologic students The emphasis on the nonsurgical treatment of squint is of particular interest to older students Many ophthalmologists will think the author is too conservative in his treatment but on careful evaluation they will find his use of cycloplegics and prisms is far from conservative and his surgery is perhaps more radical than that of many This book should be very interesting to all ophthalmologists and orthoptic technicians and should be in all ophthalmologic libraries

CAPT JAMES I FERRING MC USN

SCHIZOPHRENIA An Integrated Approach edited by *Alfred Auerback* M D 224 pages Illustrated Ronald Press Co New York N Y 1 9 Price $ 50

This book has been edited in an effort to present the current thinking and the present status of research and therapy of schizophrenia from the biochemical neurophysiologic and communicative aspects Outstanding psychiatrists anthropologists ethnologists and psychologists present papers originally read in connection with the 1 9 8 Hawaiian divisional meeting of the American Psychiatric Association These are discussed or enlarged upon by others in the same field giving a detailed and comprehensive overview not only of what is going on now and what direction thinking and research are taking but also of the therapeutic potentials which each of these may indicate now and for the future The results of the efforts are noteworthy and remarkable Those with a narrow perspective regarding schizophrenia are shown the wide ramifications of the disorder in all phases of the patients life The confusing situation regarding matter such as the taraxein studies are discussed clearly and in detail The review of the Russian literature on recent neurophysiologic research findings is interesting for information and for future study A discussion of the psychotherapeutic aspects of schizophrenia is very readable This excellent volume belongs in the library of all members of the psychiatric team as well as physicians and counselors in social and religious fields It could well be revised and republished in its present format on a biennial or other recurring basis to keep every abreast of this luminous literature on this subject The editor deserves an unending gratitude for his well balanced and careful presentation of the most complex subject in the field of medicine There is an excellent index by name and subject and an adequate bibliography is given with each subject chapter

LT COL PAUL SCHRADER, MC USA

PATIENT CARE AND SPECIAL PROCEDURES IN X RAY TECHNOLOGY by *Carol Hocking* Lenzies R N B S and *John C Watt* R T 903 page illustrated C V Mosby Co St Louis, Mo 1 9 Price $

This is a rather detailed well written and well illustrated book for the x ray technician It fills a long felt need for the student in x ray technology and will be valuable for the certain technical library Care of the patient as an individual at in the several states throughout the book

COL PAUL A PADEY MC USA

D seases o Med cal Progress A Surv y of Dise ses a d Synd mes Uninte tionally Induced th R ult f P ope ly Indicated Wid ly Accepted Thera peuti Procedures b *R bert H M er* B S M D Maj Medical Corps U S Army w th f rew d by *F Den ett 4d m* M.D 131 pa es Cha les C Thoma Publ h Springfield Ill. 19 9 P ice $4

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Autom tic Ve ila i o th Lu g by *W ll am W M ll* M A M.B B S F F.R.C S F F.A.R.C S *L Pe d ll B ker* M B B S F F.A.R.C S d *P ter W Thomp* B A. M.B B Chi F F.A.R.C S with h pters n Phys cs f Automat t l tors by *W W M pl s o* Ph D A In t. P 349 pag illu trated. Cha les C Th m s, Publishe Spri gfield Ill 19 9 Pr ce $10 .0

Surgical Seb i Gui e, by *Lo is T P l mb* M D M S F.A C S 08 pages ll trated. Yea Book Publi h rs I c Chicag Ill 19 J Pr ce 6

Anesthesia fo In ants and Child by *P b rt M Smith* M D with f ew d b *R b rt E G* M D 418 pag illu trated. C V M by Co St. Louis Mo 19 9 Price $1

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A Syn ps o Sk n D eases by *B th l S lom* Jun M.A M D F R C P I 294 pages W lliam & Wilkin Co B ltim e Md 19 9 P ice

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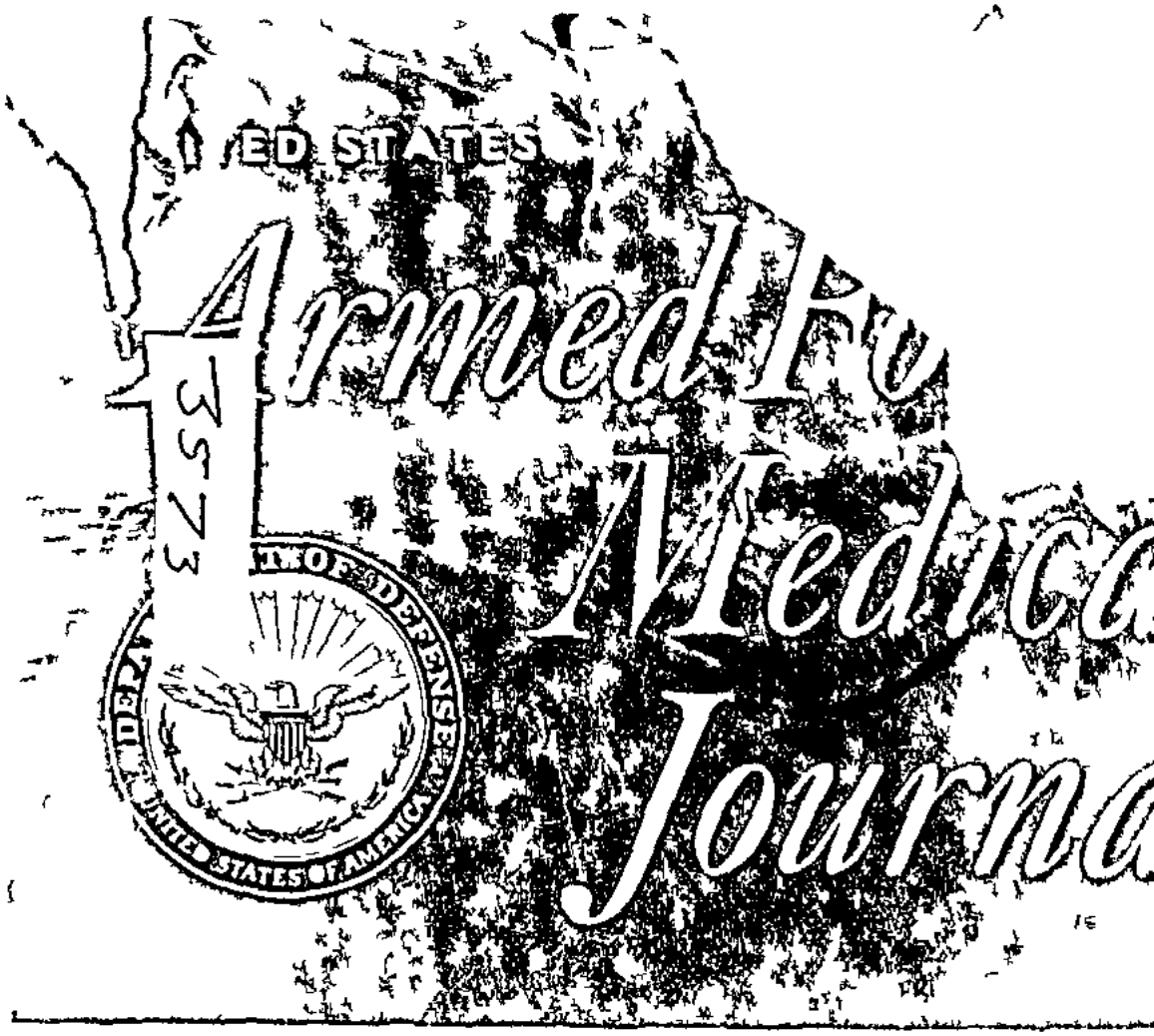
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Season's Greetings

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Monthly Message

Many tributes have appeared in the press following the passing of the late General of the Army George C Marshall but one of the most moving and imaginative was in a sermon by the Dean of the National Cathedral in Washington General Marshall dared a great *country to be generous and incidentally gave this country a new idea* of service to the world

General Marshall was far more than a great soldier He was a great statesman not only in this country but truly a statesman of the world interested in its rapid reconstruction and the maturing of civilization toward a peaceful future In the winter of 1919 in World War I while awaiting my return to this country from Dijon France the then Colonel Marshall was sent by General Pershing to various places to narrate the strategy of the American Expeditionary Force from the date of its commitment in Europe As a very young man I was greatly impressed with his presentation for its clarity its conciseness and its humility of expression I recall writing to my family that evening that I had just heard a very fine talk from a young colonel whose destiny promised greatness How little did I realize then that this prophecy born of enthusiasm would be fulfilled and that I would have the honor of serving under him for a second time

His address at the Harvard Commencement when he outlined the Marshall Plan electrified the world and it was in that address and in the conception of his plan that he had the vision to dare a great country to be generous

Frank B Berry

FRANK B BERRY M D
Assistant Secretary of Defense
(Health and Medical)

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Foreword

The *United States Armed Forces Medical Journal* is a monthly publication of professional and administrative information for medical personnel of the Department of Defense. The Assistant Secretary of Defense (Health and Medical) and the Surgeons General of the United States Army, Navy, and Air Force invite members of the regular and reserve medical services, the professional consultants of the military departments, and other physicians and health scientists with an interest in Department of Defense activities to submit manuscripts for publication in this *Journal*.

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Assistant Secretary of Defense

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Respiratory Allergies in Alaska

Clinical Analysis Pollen Survey and Botanic Review

CAPTAIN ROLAND W MOSKOWITZ USAF, MC

WITH ALASKA ASSUMING greater importance in the light of its recent admission to statehood and its rapidly increasing population, a medical evaluation of its various health problems becomes more vital Among the fields requiring closer study is that of the respiratory allergies While the author was stationed at the U S Air Force Hospital in Fairbanks, Alaska, the department of otorhinolaryngology and the medical outpatient services noted that a relatively large number of respiratory allergy cases were being seen including perennial vasomotor rhinitis, seasonal allergic rhinitis, and asthma A common belief has been that illnesses of this nature are infrequent in a climate such as this[1] Review of the literature however as well as communication with one of the larger allergy laboratories in this area, reveals that there have not been any complete botanic surveys of Alaska pertaining specifically to hay fever producing plant[2] Similarly in a study of atmospheric allergens in Alaska in 19[illegible] was noted that there were no reports available at that time concerning clinical allergy in Alaska Accordingly the present survey was set up to obtain information on the types of respiratory allergy [illegible] their incidence and the factors affecting these diseases, such as counts physical factors and botanic surveys

CLINICAL SURVEY

The population studied was that of a moderately [illegible] munity Cases of typical perennial rhinitis [illegible] and asthma were referred to the author for [illegible]

[illegible] U S Air Force Hospital Ladd Air Force [illegible]
[illegible] and will appear in the May Fur Initiative [illegible]
[illegible] supported by a grant and facilities of the [illegible] Laboratory

A history and physical examination were performed on each patient along with a leukocyte count differential nasal smear and sinus and chest roentgenograms where indicated For several reasons not all patients with respiratory allergy were evaluated Patients who had no difficulty with their illness during their stay in Alaska were not seen Other patients could not be evaluated because of various exigencies such as military leave shortage of personnel and time lost from duty Following the clinical evaluation patients were studied as to the course of their disease in Alaska and the factors relating to this were analyzed

Result Analysis of the charts of 28 patients revealed the following

1 Diagnoses There were 17 diagnoses of perennial vasomotor rhinitis 6 of seasonal allergic rhinitis and 8 of allergic asthma Some patients had more than one clinical entity

2 Sex There were 14 males and 14 females in the study

Age The range was 3 years to 38 years reflecting the young population studied

4 Duration of symptoms The shortest period was 6 months and the longest 30 years

5 Allergens according to history This pertains to allergic factors involved at any time during the patient's history It does not necessarily mean that a specific allergen was causing symptoms in Alaska at that time The allergens and numbers of patients affected were as follows

Ragweed 3	Smoke 1
Grass 6	Wool 1
Trees 3	Mold and fungi
House dust 9	Upper respiratory infection 1
Dust mites	Psychic
Feathers	Unknown factors 9
Papain 1 test 1	

6 Time of year There were 21 perennial cases and 19 seasonal cases Several patients had multiple disease complexes

7 Symptoms while in Alaska In 3 patients symptoms improved in 14 they were aggravated and in 10 they remained unchanged Information about 1 patient was lacking

Comment The symptom complexes comprised the several types of respiratory allergies including perennial vasomotor rhinitis seasonal allergic rhinitis and both seasonal and perennial asthma It is apparent from the study that these allergies do exist in this subarctic climate and often become worse in this area than in a more temperate climate It will be noted that the symptoms of 21 percent of the

patients became worse while they were in Alaska This high incidence was to be expected however, because only those patients who were clinically active were likely to be seen, while symptom free patients might not be included in the study The respiratory allergies constituted a major group of diseases observed in the Fairbanks area and were the cause of considerable man hours lost

A review of the allergenic factors concerned in the patients studied reveals that only 3 patients might be expected to have improved in Alaska because of the absence of ragweed as ascertained both on botanic survey and by pollen studies However inasmuch as 2 of these patients had multiple allergies, they were not necessarily free of symptoms while in this area

Factors other than specific allergens make the Alaskan military residents unusual in their susceptibility to these diseases Emotional adjustment to the difficult subarctic life made the psychogenic factor a moderately important one Very low humidity was a second factor that increased physical susceptibility to respiratory tract symptoms Many families attempted to overcome this drying effect on the mucosa with humidifying procedures, but many patients were seen who had a nasopharyngitis solely because of drying It can readily be conceived that a person suffering from a perennial vasomotor rhinitis is more likely to have symptoms in this subarctic environment than elsewhere Heavy clothing was a third factor that introduced a considerable amount of allergens into the home At the same time ventilation was almost nonexistent because of constantly closed windows and heavy insulation

Laboratory studies confirmed the clinical impressions in many instances and at times were the initial indication for an allergy survey in certain patients such as those presenting with nasal polyps Of 21 patients on whom leukocyte and *differential* counts were performed 7 or 33 percent had eosinophil percentage above normal 4 percent or higher Of 12 patients whose nasal smear was examined for eosinophils only 2 had elevations that would be considered abnormal Roentgenograms of the paranasal sinuses revealed some pathologic change in 13 of 23 patients or 6 percent in none of whom it could be considered severe In 14 patients chest roentgenograms were done all reported as being within normal limits

POLLEN SURVEY

Pollen counts were carried out approximately three times a week For this the standard gravity sampling device used was placed on the farthest corner of the hospital roof as far as possible from any

obstruction A slide area 4 84 cm quare was counted after a 24 hour exposure and converted to pollens per quare cent meter usin_ Cal berla s solution for stain The months of July 1956 through Novem ber 1956 were included in the study providing a representative ample of summer and fall months

Table 1 gives the incidence of pollens and mold spores by monthly distribution Each slide was exposed for a period of 24 hours The figures in parenth eses represent the total pollen count on each slide for a given month using 4 84 sq cm the area under the cover slip as the counting area The open figures repre ent the pollen or spore count for a given month after reducing the area of counting for each slide to 1 sq cm Both figures are reported in order to include certain pollens that occurred in very small numbers For the period studied the pollens and spores of significance appear to be Gramineae and mold spores

Table 1 *Monthly distribution of pollen and mold spores*

	July (11 slides)	August (9 slides)	September (12 slides)	October (14 slides)	November (6 slides)
Betulaceae (birches, alders)	(10) 2	(1) 0	(0) 0	(1) 0	(2) 0
Chenopodiaceae (goosefoot)	(30) 6	(7) 1	(0) 0	(0) 0	(0) 0
Compositae (sunflower)	(2) 0	(2)	(0) 0	(0)	(0) 0
Cyperaceae (sedges)	(2) 0	(2)	(1) 0	(0) 0	(0) 0
Ericaceae (blueberry, heath)	(0) 0	(1) 0	(0) 0	(0) 0	(0) 0
Gramineae (grasses)	(50) 23	(15) 3	(9)	(1) 0	(0) 0
Lycopodiaceae (club moss)	(2) 0	(60) 12	(9)	(0) 0	(0) 0
Pinaceae (pines, spruces, firs)	(3) 1	(0) 0	(1)	(0) 0	(2) 0
Salicaceae (willow)	(3) 1	(1) 0	(3)	(1) 0	(0) 0
Mold spores	(41) 8	(95) 164	(158) 3	(2) 0	(0) 0
Undetermined	(0) 0	(13) 3	(8)	(0) 0	(0) 0

Comment As mentioned earlier the significant pollens and spores consisted of Gramineae and mold spore The pollen and mold count fell markedly during October and November and it is believed that this absence of air borne allergens would persist throughout the win ter months while snow was on the ground Although it is possible that allergens may be carried great distances and then be recovered on slides even though all vegetation in this region was covered studies suggest that there is in fact little settling of pollen transported from great distances even if it is present in the middle and upper air It is likely that a gradual increase in pollens would occur about mid April and May as warmer weather appeared It is further noted that the pollen and mold studies consisted of outdoor samples only so that the significance of these elements indoors has yet to be

determined and could well be significant in the maintenance of perennial rhinitis It is highly significant that no ragweed was present on any of the slides, confirming the findings of Durham in a 3 month study in 1939 [5] In his report, covering the months of July, August, and September in Nome, Fairbanks, and Juneau, Fairbanks was found to have the fewest pollen grains and the most spores while Nome had the fewest spores and the most pollen Grass pollen constituted over two thirds of all pollen seen in that study The author concluded that the possibility of inhalant allergy from pollen and spores in Alaska was remote and was confined to a few days of light exposure to grass pollens in late June and early July in southern and central Alaska, and a month later in the vicinity of Nome Stier [6] states that in his experience however with special reference to southeast Alaska, this does not necessarily hold that patients who have symptoms from grass and mold sensitivity in the Seattle Vancouver area will invariably have symptoms in the southeast area of Alaska when the grasses and weeds are actively pollinating This latter impression would be more consistent with the authors experience in that inhalant allergy was responsible for clinical symptoms in a number of patients in the Fairbanks area, and over a considerable portion of the year

BOTANIC SURVEY

The botanic survey was based on available literature leaning heavily on Hulten [7] and Anderson and on recent biologic surveys in Alaska which were concerned with the presence of allergenically significant plants in the Fairbanks region

The vegetation of interior Alaska is that of the northern coniferous forest that extends through some 10 degrees of latitude across North America Spruces tamarack quaking aspen balsam poplar and paper birch are the only trees present These frequently occur in dense stands but as a result of forest fires logging mining and agriculture many areas have only sparse forest cover Dense growths of willows alders dwarf birches and ericaceous shrubs are the dominant vegetation in second growth stands In other areas grasses sedges and various herbaceous plants are locally abundant The ground surface is almost invariably covered with dense growth of lichens and mosses especially in areas where the soils are perpetually moist from melting of ice permafrost beneath

A listing of the allergenically important vegetation in the Fairbanks area and its relative abundance there follow Other allergenically important plants were evaluated for their presence in this

area but only those mentioned were found in any significant number

1 *Trees* Spruce both black and white paper birch aspen and cottonwood balsam poplar are moderately abundant Tamarack is present but in relatively light amount

2 *Grasses* Blue joint grass and quirrel tail grass are present in moderate abundance Barley smooth brome grass meadow fescue red fescue sheep fescue June grass cultivated orchard grass quack grass rye cultivated slough grass and wheat cultivated are also present but in relatively small amounts

3 *Shrubs and weeds* Dwarf birch willow and alder are moderately abundant while bulrush dandelion goosefoot lambs quarters nettle mustard common plantain sagebrush or wormwood sheep sorrel and juniper are present but in relatively light amount

4 *Miscellaneous* Wild rose is present in moderate abundance Alfalfa cultivated aster yellow clover cultivated daisy lily vetch and yarrow are present in light number in this same area

It is hoped that this listing of allergenic plants in the Fairbanks area will provide information for more intelligent therapy and desensitization of patients in this area A complete correlation between the plant survey and pollen findings is not possible because pollen was not collected in the tree pollinating season and in part of the grass pollinating season In addition pollens may have been missed if the plant represented was not especially abundant in the localized area A review of the positive pollen findings however does reveal a definite correlation between pollens found and plants seen in this area More specifically pollens of grasses alder spruce goosefoot birch yarrow and willow were identified on the pollen slides exposed and were noted in varying abundance in the botanic survey

SUMMARY AND CONCLUSIONS

Clinical analysis pollen review and botanic survey relative to respiratory allergy in Alaska have been carried out Twenty eight cases of respiratory allergy including perennial vasomotor rhinitis seasonal allergic rhinitis and asthma are analyzed Sources of allergens according to patients histories included trees grasses ragweed lesser ragweed dog or cat dander feathers paper lint smoke wool mold mildew fungi and upper respiratory infections Unknown factors were operative in 9 cases Symptoms became worse in 14 patients while hospitalized and improved in during their residence in Alaska Pollen counts performed three times weekly from July through November revealed many pollen types to be present For the period

studied, however, only those of Gramineae or grasses and mold spores were present in significant number

The botanic survey reviews the allergenically significant vegetation found in the Fairbanks area The listing includes a moderate number of trees grasses, weeds, shrubs and miscellaneous plants It is significant that ragweed was absent both on pollen count studies and upon botanic review

It is believed that factors other than specific allergens make this area unique in the susceptibility of its population to these diseases These factors include (1) the necessity of psychogenic adjustment to subarctic living (2) very low humidity of the air with consequent drying of the respiratory passages and (3) the heavy materials used for clothing and bedding, including animal furs, woolens and cottons, that added considerably to antigen accumulations in the home while interior ventilation was not improved by constantly closed windows and heavy insulation

Respiratory allergies do exist in this area and require the usual considerations in study and treatment Further investigation is recommended to obtain a complete pollen survey for a 12 month period, as well as mold and spore analyses on an indoor basis

ACKNOWLEDGMENT The author is deeply grateful to Dr Albert W Johnson of the Department of Biological Science of the University of Alaska for the pollen analyses and for his assistance in the botanic reviews and to Major Victor M Fishman chief of otorhinolaryngology for his assistance with the clinical study Sincere appreciation is expressed to Airman John Polster USAF for his devotion in collecting pollen slides throughout the most adverse weather conditions Finally thanks are due the personnel of the Arctic Aeromedical Laboratory and Col Howard F Currie USAF MC who was then commander as well as the 5001 USAF Hospital Col Carlos Alden USAF MC commander for assistance throughout all phases of the work

REFERENCES

1 DURHAM O C Atmospheric allergens in Alaska *J Allergy* 1 30–300 Mar 1941

2 MAXEY I W Personal communication

3 DURHAM O C Volumetric investigations of atmospheric allergens proposed standard methods of gravity sampling counting and volumetric interpolation of results *J Allergy* 1 [illegible] Mar 1941

4 HULTEN E A Aspects of Arctic botany *Univ Sc entist* 43 0–32 Apr 19

DURHAM O C Pollen prevalence and pollen free areas *JAMA* 4 148 10 30 Mar 1 1

5 STIER H F British Columbia and Alaska In SAMTER M and DURHAM O C (editors) *Regional Allergy of the United States Canada Mexico and* [illegible] Charles C Thomas Springfield Ill 19 11–[illegible]

7 HULTEN E *Flora of Alask and Y kon* Lunds Universitets Arsskrift Lund Gleer p Sweden 1941–1949 9 part
8 AN ERSON J P Flo of Alaska and adjacent parts of C nada an illus trated and desc ipti e t t f ll vascula pla ts known to occur within th egi n co ed *Iow Stat C llege J Sc e c* pt I Pte idophyta and Gym permae 18 13 –1 6 Oct 1943 pt II Typhaceae to Poaceae 18 318–34 *July 1944 pt III Cyperace to Orchidaceae 19 133– 05 Jan. 194* pt. IV Dicotyledonea S licacea (except Salix) t Cary phyllaceae, 20 213–57 Jan 1946 pt. V Cabom eae to D oserac a 0 29 –347 Apr 1946 pt. V I G assul eae t F baceae 1 363–4_3 July 194 pt. V II Ge aniaceae to Plumb ginac ae 23 13 –18 Jan. 1949 pt V III Ge tianace e to C m panulace 24 19–71 Jan. 1950 pt IX, C ch iace e A te ac ae (Compositae) 6 387–454 Ap 19
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Traumatic Mediastinal Hematoma

LIEUTENANT JOHN R WILLIAMS MC, USN

MEDIASTINAL TUMEFACTIONS have evoked considerable interest during the past several years, but review of the literature[1] reveals only a few reports of traumatic mediastinal hematomas

The potentiality of nonpenetrating chest trauma has been known for many years In 1884, Erichsen[2] stated "Contusion of the lung without injury to the pleura covering it may happen from severe blows on the chest, as from falls from horseback or kicks on the side It may be complicated with fracture of one or more ribs but this is not necessarily a concomitant of the injury" A traumatic mediastinal hematoma appears to have been first reported by Korner, who in 1916 described a soldier who developed a posterior mediastinal hematoma following a nonpenetrating grenade blast Horn,[3] in 1930 observed a mediastinal hematoma after a patient had sustained a laceration involving the left internal mammary artery

Three cases of paravertebral intramediastinal hematomas were presented by Fiselsberg and Gold in 1931 The patients had sustained injury resulting in compression fractures of the dorsal or lumbar vertebrae Zimmerman in 1936 encountered a patient who had received a lateral crushing chest injury with resultant fractures of ribs left clavicle and right capula as well as a mediastinal hematoma More recently other authors have presented cases of mediastinal hematoma incident to nonpenetrating trauma

The following case reports illustrate mediastinal hematomas resulting from both penetrating and nonpenetrating trauma

CASE REPORTS

CASE 1 This 18-year-old youth was involved in an automobile accident in which he was thrown from the car and hurled against a wooden post Before transfer to this hospital he was seen at a dispensary where tenderness in the left parasternal area was noted A small anterior axillary laceration was sutured On admission the patient complained only of left chest pain Physical exami

From U S Naval Hospital Jacksonville Fla

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Fig 1 (Case 1) Intralobar pneumonia showing bulging and downward displacement of the right interlobar fissure and consolidation of the left lung

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Anterior chest tenderness to firm palpation was noted The abdomen revealed guard ng and tendernes of palpation in the left upper quadrant

Radiographic examination of the chest (fig) in the anterop terior pro jection revealed bilateral linear widenin of the mediastinum compatible with



Fig e 2 (a 1) La te al roe tg n g a re li g a s mi gl l l t l (l te l l s) for e l l t e l s e t l rh rily in il l ft l w r lobe

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ing this entity from neoplasm or aneurysm In the cases reported by this author diminution in width of the mediastinum was apparent after a week As indicated in table 1 time for complete resolution of the hematoma may vary considerably The range of the observed cases is from 2 to 24 weeks with the average time being 7 3 weeks



Fig 4 (Case 1) Lateral roentgenogram of chest showing widening of mediastinal shadow and tracheal displacement

Symptomatology The symptoms resulting from a mediastinal hematoma may vary considerably and no specific clinical finding or pathognomonic of this entity As indicated in table 1 a fullness or distention of neck veins dysphagia shortness of breath and Horner's syndrome may occur Severe shock and differential blood pressure of the upper extremities have also been reported There may however be no significant symptomatology

Hemorrhagic site Mediastinal hematomas secondary to non penetrating trauma appear to result from disruption of small veins draining the mediastinal branches of the internal mammary and intercostal arteries or the aorta Mediastinal hematomas encountered in patients with fractures of the sternum and dorsal vertebrae are obviously secondary to these fractures



Figure (a 2) A patient receiving warfarin therapy with a traumatic mediastinal hematoma

Roentgenographic findings Initially mediastinal hemorrhage presents as a diffuse linear unilateral or bilateral mediastinal widening As organization and contraction of the hematoma occurs it becomes smooth and concentric simulating neoplasm or aneurysm With serial roentgenograms this early change is important

in differentiation of mediastinal hematomas from other pathologic entities As emphasized by Endres the initial chest radiograph is usually in the anteroposterior projection consequently the mediastinal widening may be either overlooked or considered insignificant

The possibility of aortic rupture should be considered in the differential diagnosis when a mediastinal hematoma is observed When progressive mediastinal widening is noted on serial radiographs aortic rupture becomes the most likely source of hemorrhage

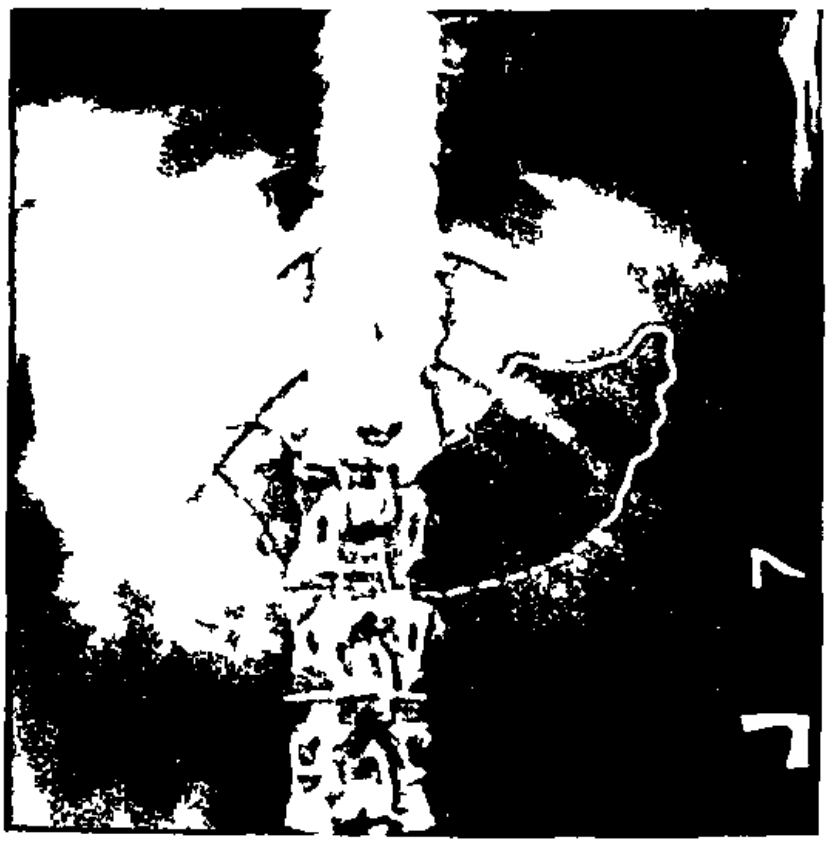


Figure 6 (case 2) Abdominal roentgenogram showing widened contour of the mediastinum with posterior displacement of the trachea and suggesting hemorrhage originating from ruptured descending thoracic aorta

The substernal hematoma is seen in the lateral projection as a semispheroid mass adjacent to the posterior aspect of the sternum As noted in case 1 the hematoma after partial resolution was seen only in the lateral radiograph

Eisenberg and Gold describe the paravertebral intramediastinal hematoma as a fusiform density having its greatest width at the site of the vertebral body fracture

Associated findings such as esophageal and tracheal deviation, fractures of vertebrae and sternum, pulmonary contusion, interlobar hematoma, pulmonary hematoma, and hemothorax may be present



Figure (case 2) Anteroposterior roentgenogram 2 weeks after the accident showing normal mediastinum

Treatment From review of the literature it becomes apparent that the prognosis in most patients with mediastinal hematoma is usually good Those who succumb usually have concomitant traumatic changes causing their death Only a few patients require treatment *for the mediastinal hemorrhage Definitive therapy consists* of decompression of the mediastinum in patients with cardiorespiratory embarrassment Patients with aortic rupture require surgical grafting when this is feasible

SUMMARY

Two cases of mediastinal hematoma secondary to chest trauma are reported A review of the literature is presented with emphasis upon the roentgenographic findings treatment hemorrhagic site and symptomatology The importance of following post traumatic chest lesions with serial radiographs until resolution is complete is stressed

REFERENCES

1 F t N S g y Vol 1 1894 Cited by PAYN M C nt f l g with t t l inj y l t MJ 1 1 9–14 J n 16 1909
K NER O I l tr t ti h H at in M dl ti t it t rl V d gung der Speiser l d r L ft h t h R k l hm t g Zt l f Ol e h f I kl t d L ft gc 3 3–36 1916
3 Ho v H Bem ke sw t F ll ne Stich let d Art m mm tria l t it g Med ti lh im t A q g ll He lu g Z t lbl f Cl 0– O t 11 19 0
4 E ELS E A a d G t E Ub d j q rt b le t medi t al H m t m b l W lell l l D t l e Zt cl f Cl 33 3°9–336 1931
Z M ER A L M Traum tic m dia ti al h m hage 1 J S rg 31 1 0–1 1 Ja 1 (
6 DUYST R, D W E p a ma g l jk d al va h m m li t t m t h e th A l l t j l g l 8 144 –1446 Ap 1941
F p ESS Z F T aumati me li tinal l e t m 4m l P tg l 0 6– 80 O t 1 3
8 L F ET E G T a mati hem medi ti m J Tl a S g 9 9 6C3 J 19
9 S H ITT H G R l h t q f de Lu g l l H m t m h g u f n I tj p x 1 33 o33 A 1940
10 T s P A l K LIN W M T a m tic h mom d st m t l S g 3 316– 18 Au 1 (
11 V S E Ro L n l M EL I L hem méli tin t t q 4 l lég 33 10 108 Ap M 19 3
1 B ow J D nd F D AN P S I ulmon nt n f l t t tho po t f P jl MJ 46 3 3 4 Ja 1343
13 BUE ER H A an l TH M s J C m bed f t p lm ry h ma t I ti l D Cl t 4 4 J l 19 8
14 D LEY F S l BR I A III Che t j le l S g 11(608– (S S 1 H
1 E LO M Lun inj y n i ta t th av th ep t f e se I t J S j 8 9–4 J ly 1940
16 C R K NET A l H s P J l u l p lm h ge l t l t t 1 J l tj l 10 9–10 J 1)
1 K J D l CUR G M I j d t l t nati f hi h e ll l (g & Ob t 4 3–(J 1 4
18 M C D B l S t F R d l f i j l f h t l t l l l 1S 133–14 M y 194
19 O (R F d n i f f t l n l nt I t 84 S yt 4 194

20 Parmley L F Manion W C and Mattingly T W Nonpenetrating traumatic injury of heart *Circulation* 18 371–396 Sept 19 8
21 Salyer J M Blake H A and Forsee J H Pulmonary hematoma *J Thoracic Surg* 2 336–340 Apr 19 3
22 Savage O Pulmonary concussion (blast) in non thoracic battle wounds *Lancet* 1 424–428 Apr 19 4
23 Sealy W C Contusions of lung from nonpenetrating injuries to thorax *Arch Surg* 9 889–898 Oct 1949
24 Welkind A Intrapulmonary hematoma due to nonpenetrating injury *J M Soc New Jersey* 4 01– 03 Nov 19 0
25 Williams J R The vanishing lung tumor pulmonary hematoma *Am J Roentgenol* 81 296–30 Feb 19 9
26 Wilson J V Pathology of closed injuries of chest *Brit M J* 1 470–474 Apr 1 1943
27 Zuckerman S Experimental study of blast injuries to lungs *Lancet* 2 219–224 Aug 4 1940

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One of the most important medical problems being studied today is seriously hampered by an unusually large number of species difference Among the key points of attack in the investigation of the cause of coronary heart disease is the lack of correlation between findings in man and those in a host of experimental animals a circumstance which has become the rule rather than the exception The morphologic features of the atheromatous plaque that are produced by extreme elevation of blood cholesterol in the experimental animal do not reflect in all detail the condition found in man The development of a thrombus at the site of the atheroma has not been accurately reproduced in the laboratory animal The intricate biochemical steps in the blood clotting and plasminogen systems in man differ in important ways from those in other animals The pattern of lipoprotein particularly the ratio of the so called α and β fractions and the influence of dietary fat on the fractions are not the same from man and laboratory counterpart The effect of fat ingestion and the influence of the degree and type of unsaturation of the fat on the level of blood cholesterol frequently do not follow the same pattern when one moves from man to various other animal species —Richard H Barnes The Span From Rat to Man *New York State Journal of Medicine* August 19 9

Interaction Patterns Among Military Prison Personnel

LIEUTENANT LEON D HANKOFF MC USNR

THIS STUDY is directed toward an understanding of the social relations of a penal institution With the impact of delinquency on the American scene greater demand is being placed on the social sciences for answers A critical area is that of the penal institution society s time honored method of handling the delinquent Despite its shortcomings the penal institution remains the necessary if not the only means of dealing with many delinquents Any scientific utilization of existing penal facilities call for an understanding beyond the conventional and material dimensions of the institution

A dynamic understanding of the penal institution is not readily achieved The psychiatrist entering a penal institution is impressed by the enormous barrier existing between himself and the prison population both inmates and personnel The penal institution exists for the restraint and punishment of offenders Suspicion and secrecy are the order of the day An unwritten but well established prison code has set the prisoner against any confidential communication with authority The custodial officers on the other hand are immersed in similar attitudes of vigilance They have a nerve racking job to do and their interest is centered about maximum security discipline and a convenient autonomous daily routine

The psychiatrist placing a high premium on individual needs and freedom of communication finds his standard in marked contrast to the base line of penal regulations and attitude Powelson and Bendix considered this conflict of attitudes between the psychiatrist and the custodial officer and concluded that for the present there is no satisfactory professional solution for the psychiatrist who chooses

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to remain and work in the penal institution They pointed up the corrosive influence of the prison environment on the psychiatrist's attitudes and his eventual conscious or unconscious surrender to authoritarianism In addition to this conflict in his own values, the professional worker may encounter difficulty because of his appearance to custodial officers as a potential reformer or theoretician—the perennial conflict between the planner and executor of any operation The custodial officer is intent on a well oiled daily routine He may be suspicious and disdainful of change, considering it as unproven dangerous or impractical In discussing his experiences as an innovator on a prison psychiatric ward, Graff [3] stated that the guards sometimes viewed the psychiatrist as "on the side of the inmates against them In this respect it is of interest that wardens have found themselves relatively powerless when attempting to alter the basic attitudes or practices of their lower personnel echelons toward the prisoners [4, 5] It would seem, then, that our successful intervention in the penal institution must begin with an understanding of the institutional ties of the individuals within it

Much of the groundwork for understanding the penal environment has been done but the dynamics of the personnel remain largely uncharted The emphasis in penal psychology has usually been on the inmate As in the case of the mental hospital investigation of the occupant has long preceded that of the custodian Clemmer has provided the basis for an understanding of the prison environment in his comprehensive monograph [6] but has reported few observations on the social field of the personnel Clemmer described the prisoner's culture and its dynamics, demonstrating the stability of this culture despite population flux Although acknowledging the stabilizing influence of the prisoner's code Miller has pointed out its antirehabilitative and tyrannical effects particularly when utilized by the custodial officers to maintain order That a corollary personnel culture must exist side by side with this prisoner culture is apparent and has been alluded to in the fictional if not the scientific literature

The present report is based on observations of 5 military penal institutions 3 Marine Corps brigs 1 Navy brig and 1 Army stockade It is felt that the institutions observed are representative of most military penal institutions, and that some of the information may be applied as well to problems of penal institutions generally

One of the Marine Corps brigs will be used as the focus for the description although observations from all five institutions contributed to the conclusions As a military psychiatrist, the writer was able to make direct observations of the brig and collect information from its population over a 1 year period The military psychiatrist

was called on for formal brig inspections screening of personnel for brig duty screening of prisoners for retention in service and psychiatric treatment of personnel and prisoners In addition there were chance observations while transacting the formal brig matters group discussions with personnel and social contacts with brig officers The discussion groups contained 4 to 8 men having the same rank or brig function and were conducted in a nondirective manner ostensibly concerned with prisoner management

OBSERVATIONS

The formal trappings of the brig were that of a rigid military hierarchy operating on a detailed daily schedule for both prisoners and personnel The philosophy and functioning of the brig were stated meticulously in a brig manual always on hand for policy decisions and instruction of incoming prisoners and personnel

The physical plant of the brig is traditionally divided into 2 areas the compound and the office The compound is the prisoners living area In the particular brig under consideration the compound was a large square enclosure enclosed by a double barbed wire fence entered by a single gate and punctuated at regular intervals by wooden frame watchtowers The office was a small painted wooden building outside the compound near the gate Here the administration of the brig was carried out records kept and orders issued

The brig was operated by 33 officers and men The hierarchy was headed by 9 commissioned officers Next in line to the officers was the staff composed of 4 senior noncommissioned officers 1 acting as warden and the other 3 as his assistants or alternates The remaining 97 men were designated as compound personnel and were divided into types (1) turnkeys who maintained the gate (2) tower sentries who manned the watchtowers and (3) compound entries who maintained order within the compound The hierarchic system was not only defined by rank and function but by physical sphere of activity as well Thus the officers and staff did their work largely in the office while the compound personnel had their posts at the gate towers or grounds of the compound respectively The turnkeys were the ranking enlisted men of the compound area usually being junior noncommissioned officers The prisoner population numbered 40 to 60 men

Official communication was organized in typical chain of command or line fashion that is from the initiator to the next adjacent rank Almost always a superior initiated the communication and it was passed in orderly fashion along the line to successively lower ranks

Communication was rarely initiated by inferiors to superiors and even more rarely was there any direct communication between nonadjacent ranks, such as a commissioned officer and a compound sentry

The officers The commanding officer of the brig, a colonel, had many other duties along with his command of the brig He had no office in the brig and his contacts with the brig were limited to brief formal inspections His junior, designated the brig officer, had the actual executive function of the brig and spent most of his working day in the brig office The contacts of the commissioned officers with brig personnel were extremely formal The brig officer conducted all business matters through the brig warden and had little direct contact with any other enlisted men When a commissioned officer entered the compound, the entire area was called to attention and usually remained rigidly so until he had completed his business The brig officer learned about the brig activities through a set of daily reports and, unless he inquired, his picture of brig functioning was apt to be a rather lifeless one Much information did not reach him when situations could be handled comfortably by the staff To avoid possible injustices, the device existed whereby any man in the brig—prisoner or personnel—might request a private meeting with the brig officer or submit an anonymous complaint Generally however this system never achieved any great use or value among the lower echelons of the brig

The staff The 4 staff members may be regarded as career men All had considerable experience in the military penal institution and thoroughly understood its machinery They were specialists in the execution of military penology It was their assigned task to maintain over all order of the brig as well as of the lower ranking enlisted men The staff tended to regard the brig from the point of view of a conventional rule book which we may call the charter In group discussions staff members stated their mission in the brig very concretely tended to minimize the brig's flaws and attributed administrative problems to forces outside the brig such as inadequate funds inadequate manpower climatic and tactical factors

Turnkeys The turnkeys occupied a somewhat intermediate position both in rank and function They were junior noncommissioned officers no longer involved in the laborious tasks of handling prisoners but not sufficiently beyond the compound gate to occupy office staff positions They generally presented an attitude of acceptance toward the brig organization although they did not take as orthodox a view as the staff In group discussions their thoughts often turned to matters of control and status in the brig A recurring topic was the subject of problem prisoners The turnkeys felt that the entries

were lax or cowardly in the handling of a surly prisoner One prisoner in particular had roused their anger This prisoner had maintained an apathetic passively negativistic manner throughout his brig sentence no measures or appeals could alter his uncooperative state The turnkeys experienced intolerable feelings of impotence toward this man whom the brig could not break Their feelings were somewhat assuaged by the thought that the brig manual severely limited their physical control over the prisoner They often implied that some of the brig regulations concerning prisoner management were best ignored in dealing with such situations

Sentries The actual handling of prisoners was carried out by the sentries who represented the lowest ranking least experienced and youngest of the brig personnel Their behavior toward superiors was usually one of impersonal military discipline and courtesy Their management of prisoners was often embellished by personal expressions of hostility Although no case of physical maltreatment at this brig had been proven direct observation and multiple parallel accounts left no doubt that many sentries were quite uninhibited in the performance of acts of hostility toward prisoners An entire armamentarium of methods of humiliation provocation and abuse was used by some often with the feeling that this approach was the practical solution sanctioned by the authorities

Group discussions with the sentries proved to be quite spirited and expressive They felt strongly antagonistic toward the staff particularly toward the warden The sentries felt that the staff was their adversary spying on them judging them and harassing them The sentries protested that they were treated like prisoners and frequently compared their lot to that of their captives

The sentries hostility toward prisoners was presented to the interviewer in a rather indirect fashion in obvious deference to the interviewers status nor was this hostility associated with the group pride that characterized staff directed hostility Many of the sentries explained their hostility toward the prisoners as resulting from their own oppression by the staff They said that they passed on to the prisoners the anger they experienced from the staffs harassment After a personnel inspection by the warden for example one sentry found himself particularly hard on the prisoners because he had no one else to take it out on Furthermore the prisoners were aware that the warden harassed the sentries and some sentries argued that their consequent loss of face made the prisoners harder to manage and necessitated firmer measures

The group discussion with the sentries produced a surprising number of admissions of hostile acts against prisoners The incidents

were usually presented in a modified or disguised manner. Personal accounts by the sentries were often presented with some demonstration of guilt or mock guilt. At times the "confession" concerned a very minor act that served as a screen for a more serious offense. Although the sentries were somewhat uncomfortable about their hostile acts toward prisoners, there was strong group feeling that stern physical measures are a desirable approach to prisoner control. The restrictions the brig manual imposed on the sentries were unanimously opposed by the group. At times righteous indignation ran high and the sentry saw himself as the dispenser of personalized true justice. One entry cited an instance of a senior noncommissioned officer (NCO) who, as a prisoner, was allowed special privileges. The sentry resented these considerations to the wrongdoer. In this respect, it was noted that known homosexual prisoners are often particularly oppressed in the brig, freely insulted, and segregated. Only one sentry in the group took a stand against abuse of prisoners. He had been assigned to the brig just a few days previously. Others, who might have entered the brig environment with similar feelings, had already surrendered them to group pressure. Sympathy was quite unpopular.

Retaliation by the prisoners was a preoccupation of some sentries. Incidents were recalled where ex-prisoners had met former captors outside of the brig and exacted personal redress.

The sentries readily expressed criticism of other personnel groups. In addition to their open resentment of the staff's despotic authority, the sentries were generally dissatisfied with their relationships with other personnel groups. They complained that there were exclusive "factions" in the brig personnel and that there was too much distinction between NCO and private. They stated that there should be more unity among the personnel, that the word of a sentry concerning prisoner incidents should be unquestioned, and that more action should be taken on sentries' complaints. They felt it was useless to approach the brig officer because they would either be intercepted by the warden or their gripes would be neutralized by his subsequent comments to the brig officer. The sentries also criticized subgroups within the sentry group. The compound sentries felt that the tower sentries and turnkeys tried to exert too much control over the prisoners from their peripheral positions and that this intervention was unnecessary and domineering. The sentries who were permanent brig personnel distinguished themselves from the sentries who had volunteered from other units for limited brig tours to fill out the brig complement and who they believed were poorly motivated and did an inferior job.

In discussions with the sentries the phenomenon of the group leader was regularly observed The sentries were seen in groups of 5 or 6 and 1 or 2 usually functioned as the spokesmen for each group These few were assertive and outspoken often resorted to profanity and were most open in their criticism of authority They tended to set the themes of discussion for the group and used introductory key words or incidents to invite group participation on the target subject These same men were also the most outspoken in their expressions of hostility toward prisoners and their desire for physical punishment of prisoners In the group interviews, the spokesmen were sometimes paired They usually supported each other and provoked mutual opinions back and forth across the group

Although the focus of the observations was on brig personnel it was obvious *that personnel relations hips did not function in a vacuum* apart from the prisoners Prisoner activities did affect personnel relations and the usual stimulus was some form of prisoner misconduct *In terms of actual brig observations the misconduct had a* kind of periodicity As it built up the brig officer would become aware of a constant series of incidents with prisoners being put on *report by the sentries The prisoners would engage in* minor horseplay feigned illness or exhaustion and fights among themselves Various counteractions would be taken by the personnel

In dealing with prisoner misconduct mass punishment was often resorted to that is all the prisoners were punished for the fault of one recalcitrant or undetected prisoner Prisoner cliques would be broken up by segregation or by rearrangement of sleeping quarters With continued measure prisoner misconduct would suddenly or gradually taper off and average conditions would prevail until the next pitch built up

INTERACTION PATTERNS

In attempting to formulate patterns of brig personnel behavior it is of value to use a moving frame of reference approaching the situation in terms of both group and individual psychology An effort has been made to delineate the approaches but contaminations are inevitable

From the standpoint of group relations our chief interest is in the informal elements that have grown out of the military ingredients forming the brig This informal structure or internal system to use Homans *term appears to be an extension of the existing rank structure* in which each formal group is socially isolated and suspicious of the

others The enlisted personnel of the brig grouped themselves rigidly into 3 echelons based on their formal functions and ranks the staff, the turnkeys and the compound and tower entries These lines of division were evident during on duty fraternization as well as during off duty recreation Changes in personnel did not affect the fundamental patterns for incoming personnel achieved the set standards within a short period after their arrival Nor did the youthfulness of many of the sentries give them any greater flexibility or mobility in their roles All echelons will be discussed, but the main consideration will be given to the lowest level, the sentries who constituted 17 of the 33 brig personnel and who fell heir to the most discontent and conflict

Several features of the overall brig group may be discerned The first is the nature of communication or interaction Communication was almost always initiated from above almost always had a negative or authoritarian quality, and almost never allowed for redress or interaction with its initiator Other fairly generalized features were the conflict between classes and with authority, hostility chain reactions, and rationalized substitute acting out in a downward direction

Beginning with the two officers we see a picture of almost complete detachment Orders are given, reports received, and unless something very unusual occurs the officers remain quite uninvolved with the human aspects of their personnel Of any brig personnel, they most closely approximate their formal role It is likely that they would have acted on information concerning undesirable brig practices but this knowledge seldom reached them

The staff, while not uninvolved in the brig social relations showed a similar picture of security and clear cut aims They exerted much authority over the men below them and rarely received an order from their superiors that was not passed on to men below them They tended to be somewhat disdainful of the officers secretly believing themselves to be the significant operating personnel better off if unhindered by the officers impractical and academic ideas

The turnkeys are bypassed by much of the one way communication of the brig They have been promoted out of the entry position to the gate and aspire to the next higher stage in the office Thus concerned with status they are critical of the sentries and concerned about the undominated prisoner In terms of individual psychology, it may be said that the turnkeys preoccupation with the problem prisoner is a projection of his own feelings of lack of dominance within the personnel hierarchy

The brig structure appears to weigh most heavily on the sentry He is at the bottom of the one way chain of orders He is unable to

reciprocate with the initiator receives little in the way of supportive or positive interaction from superiors and is often left in doubt concerning his acceptance by superiors The conscious hostility for the staff aired in group discussions appears to be a natural outgrowth of the frustrating situation Even if the sentry wanted to demonstrate positive sentiment for his superiors he has no access to them Concurrent with the hostile sentiment toward the staff is the hostile activity toward the prisoners Prisoner abuse may perhaps serve a homeostatic function for the beleaguered sentries in terms of their group position It serves to emphasize the sentry s position in the personnel ranks and provides him with a partial mastery of his environment

Certain sentiments within the brig atmosphere facilitated the hostile behavior of sentries toward prisoners (1) A moralistic attitude prevailed among the personnel that the prisoners are here to learn a lesson (2) The sentry group did not attach any stigma to acts of prisoner abuse (3) The sentries thought that their insignificance in the personnel rank encouraged the prisoners to be insolent and made harsh measures a necessity (4) The sentries thought that they were unsupported by their superiors in cases of prisoner misconduct and that they themselves had to settle the score with the prisoner at his own level

DISCUSSION

The sadistic practices of the sentries upon the prisoners appear to be plausibly explained by the factors of group equilibrium and group sanctions However the process whereby the individual perceives an insult responds with hostile feelings and achieves satisfaction through a hapless third party has really not been adequately explained The fractioning of the sentry s negative sentiment has been described in terms of group behavior but is not explained by the present observations

A similar problem has been considered by Thorne who has charted the epidemiology of hostility through family studies Thorne has pointed out the contagious quality of hostility its tendency toward chain reactions and its extreme potency when the recipient is in an insecure position The application of his thesis to institutions is apparent and appears borne out by the present observations of a penal institution The sentries our youngest siblings of the brig family feel subject to inescapable frustration and hostility The sentry is often young inexperienced lacks mature outlets and is hard pressed to deal with his chronic anger state Standards within

his peer group sanction downward acting out, and he readily trans lates pressures from his superiors as well as neurotic hostility into aggression toward the prisoners Of course the cycle does not end there Although severely restricted the pri oners retaliate with neg ativism accidents sluggishness, and malingering A further result, pointed out by Thorne,[9] is the build up of mutually suspicious and paranoid attitudes Although not striking in the pre ent study marked paranoid attitudes on the part of pri on personnel have been described in other studies[4] Thorne s[6] epidemiologic framework is a useful approach to the subject An intere ting sidelight in the epidemiology of hostility is the practice of mass punishment in the brig Implicit in this device is the wish that the group will become enraged and turn on the one, enforcing the discipline of the authority Thu , ma s punishment is the planned use of the retaliation motif to maintain control

Another of the phenomena to be considered in the shaping of the sentry group entiments and activities is that of the group leader As noted, there were among the entries certain individuals who were quite outspoken and who took the lead in criticism of the staff and discussions of prisoner abuse This syndrome of assertive group behavior hostility for prisoners and hostility for authority may be viewed in various contexts (1) The *individual* The spokesman may be the more basically hostile and aggressive member of the personnel group and maintain this position in the relationships observed toward the interview toward the prisoner and toward the superior (2) The sentry *group* Hostile impul es and acts have produced inner conflict and the individual seeks re olution of his discomfort through the available communication medium the group meeting The *man* who feel guilty or otherwi e uneasy about his hostile acts *may seek* to expre s himself to talk away his di comfort in receptive atmo phere He seeks to gain group acceptance and line up *group support* for his own dubious standards (3) The brig *culture* The *entire* [illegible] sentries have become the reflecters of the hostile retaliatory *element* in the penal atmo phere Hostile reactions to the staff and pri oner and his personal life fu e in his mind into a hopele s jumble of ang Furthermore anger and rage are more condoned as a ma culine fo= of expres ion than are the more feminine' *feelings of sympathy* — depression

In considering intrapsychic or personality *factors* [illegible] with the immediate pitfall of generalizing from gro p to ind= individual functioning As a group the entries were cha= by authority conflict a high level of hostility and ag=— tituted or available situations Although it cannot be =

this corresponds to the personality of the average sentry it is probable that these are features of many sentries that become aggravated in the brig setting In terms of group personality it is of interest to compare the orderly brig personnel organization with present day delinquency culture The conflict with authority the reservoir of hostility and the ready acting out all seen in the brig personnel interaction *pattern are quite discernible in modern delinquency patterns* The headline making modern young delinquent is often marked by his viciousness vandalism and flouting of the law Within this particular brig 13 successive prisoners who were delinquents were evaluated psychiatrically The majority of these showed features of chronic anger and authority conflict within the substrate of a character disorder Are prisoner and sentry struggling with the same basic problems? The growing delinquency problem and trends of western culture suggest that authority conflict is a universal theme Our present day culture is marked by rejection of the elder disdain for education and cult of youth all pointing to the conflict with established order The brig prisoner like the unsuccessful *protestant* the sentry the successful one sensitized to despotic authority

Sentries often gave evidence of their identification with prisoners in the group discussion comparing themselves to prisoners in light of the staff's activities toward them A frequent expression was that the sentry would end up a prisoner if goaded too far

Guilty fear was evidenced by the entry's preoccupation with prisoner retaliation The sentry may be staving off his prison identification through his sadistic rejection of the prisoner In a study of prison guards Jacobson has pointed out that the guard's reaction to this identification may serve to aggravate his severity toward the *prisoners In this same light it may be seen that criticism or rejection* by superiors is quite threatening to the entry because it tends to separate him from the personnel and push him more toward identification with the prisoners Another factor to be considered in the *sentry's developing sentiments is that of his proximity to the prisoners* The sentry is almost certain to have more human feeling for a prisoner whom he guards all day than an officer whom he salutes once a week The sentry is *thus in a position to acquire the attitudes of* the prisoner directly and this may well contribute to their similarity

SUMMARY AND CONCLUSIONS

Observations were made on 5 military penal institutions 3 Marine Corps brigs 1 Navy brig and 1 Army stockade The interaction *patterns of the personnel of one of the Marine Corps brigs repre*

sentative of the several institutions studied, are described The 33 men in the brig formed a rigid hierarchy characterized by overt discipline and covert hostility Hostile forces reinforced each other and a reverberating cycle was maintained in the brig through all levels Sadism engendered in brig personnel was similar to processes operating in many inmates The potent atmosphere of the penal institution is antirehabilitative, prevents improvement by piecemeal measures and might be the minimal focus of professional intervention

Professional intervention in penal functioning has often had disappointing results From the data presented it may be understood why piecemeal measures are unsuccessful in prisons The tyranny of roles in the populace overrules most material changes Usually little effort is made to change institutions on an attitudinal level At this state of knowledge, when material needs of humane standards can generally be met, it seems reasonable to assume that the crucial area to attack is that of the attitudes of the milieu Furthermore, the attitudes of the lowest level of functionary appear deserving of the most attention In the penal institution here observed if one is forced to choose between the psychiatric care and guidance of personnel and that of the prisoners attention given to personnel would appear to be most rewarding in overall rehabilitative effect on the prisoners

REFERENCES

1 Miller P R The prison code *Am J Psychiat* 114 583–585 Jan 19 8

2 Powelson H and Bendix R Psychiatry in prison *Psychiatry* 14 3–8 Feb 19 1

3 Graff N Experiences in prison hospital *Bull Menninger Clin* 20 8–9 Mar 19 6

4 Jacobson E Observations on psychological effect of imprisonment on female political prisoners In Eissler K R (editor) *Searchlights on Delinquency* International Universities Press N York N Y 1949 pp 341–368

Sutherland E H *Principles of Criminology* J B Lippincott Philadelphia Pa 194 pp 446 643

6 Clemmer D *The Prison Community* Christopher Publishing House Boston Mass 1940 p 41

Homans G C *The Human Group* Harcourt Brace & Co New York N Y 1950 p 484

8 Thorne F C Differential calculus of chronic frustration hostility aggression state *J Psychiat* 11 1–1 Feb 19

9 Thorne F C The frustration anger hostility triad a new diagnostic classification *J Clin Psychol* 34–339 Oct 1

10 Lindner M F Relationship between social attitudes warfaring and the delinquencies of youth *J Psychiat* 114 444–448 Nov 19

Principles of Nursing Care in the Management of Burns

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THE MANAGEMENT of patients with burns has undergone a marked change at the U S Army Surgical Research Unit during the past 7 years resulting in the need for nursing personnel trained specifically for this particular task Nurses should be well acquainted with the reasons for this special care and the problems involved in its administration

The over all plan for management of burns is influenced by two factors (1) depth of the burn and (2) extent of the burn as measured by the percent of involvement of the total body surface The depth of the burn will help determine the requirement for whole blood in replacement therapy It may also aid in a decision concerning exposure care or closed (dressing) care of the burned area and will indicate future requirements of surgery and grafting The extent of the burn is helpful in planning resuscitative therapy and in arriving at a prognosis

An effective yet simple means of estimating the extent of a burn is to apply the rule of nines This rule evolved by Pulaski and Tennison divides the body surface into areas of 9 percent or multiples of 9 percent Percentages for the various areas are given in table 1

During the first 48 hours after sustaining a serious burn a patient will exhibit shock as a result of changes in the distribution and content of fluids in the body and of losses and shifts of colloids and electrolytes Such a patient must receive replacement therapy if he is to have the most favorable opportunity for survival This period therefore may be designated as the period of resuscitation

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From USA Surgical Research Unit Brooke Army Medical Center Fort Sam Houston Texas

EARLY DIAGNOSIS AND PROCEDURES

Many tasks must be performed by the medical officer or the nurse, or by a combination of the two, during the first 48 hours. The medical officer makes a quick estimate of both the degree of burn and the total percent of body surface involved. He is then able to determine the necessary therapy.

Table 1. *Rule of nines*

Region	Percent of body surface
Head and neck	9
Right arm	9
Left arm	9
Anterior surface of the trunk	18
Posterior surface of trunk and buttocks	18
Right leg and thigh	18
Left leg and thigh	18
Perineum and genitalia	1

The depth of the burn is commonly referred to as first, second or third degree. Anyone well acquainted with the definitions and the objective signs of the various degrees of burn can determine the depth of injury with a fair degree of accuracy. In adult extensive resuscitation and care are usually not required in cases of first degree burns and those of second and third degree involving less than 15 to 20 percent of the total body surface. This is not always true, however, in electric or chemical burns, as these may cause extensive deep tissue damage but only slight surface manifestations.

A first degree burn is the mildest of burns and involves only the epidermal layer of the skin (fig. 1). It is characterized clinically by redness and an objective and subjective feeling of heat but there is no blistering or vesicle formation. Sunburn is the best example of such a burn. In the absence of complications it will heal satisfactorily within 7 to 10 days without specific treatment.

A second degree burn is deeper than a first degree burn and also is called partial thickness or dermal burn. The area is pink or a mottled red and the injury usually is caused by hot liquids or a flash burn. It is characterized by blistering and weeping and is painful to a pinprick. Such a burn does not involve the full thickness of the skin, hence viable islands of epithelium remain in the dermal layer. When such a burn involves more than 20 percent of the body

surface resuscitation and special care are required but under ordinary circumstances grafting is not

A third degree burn causes the most severe disturbance of body fluids and electrolytes Such a burned area is pearly white or charred It is dry and not painful to a pinprick because the injury is deep enough to destroy the nerve endings A third degree burn is called a full thickness burn and usually results from contact with an open flame It creates a problem in the loss of continuity of skin requiring replacement by a skin graft

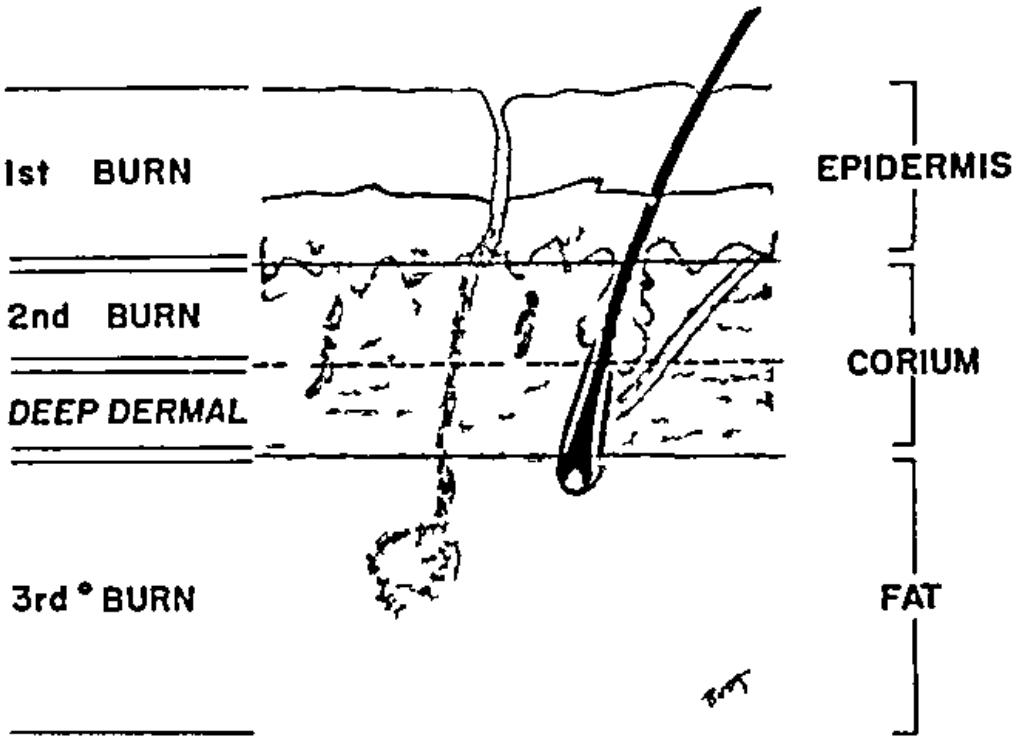


Fig 1 Diagram of the skin showing the depth of various degrees of burn

When a patient suffering burns is admitted to the hospital a number of procedures must be carried out These procedures not all of which are applicable in every patient and which are not listed in the order of precedence are (1) sedation (2) administration of tetanus prophylaxis (3) initiation of prophylactic antibiotic therapy (4) establishment and maintenance of a route of intravenous infusion (5) initiation of resuscitative therapy (6) insertion of an indwelling urinary catheter (7) determination of the need for tracheotomy (8) cleansing and debridement of the wound (9) decision as to the method of local care—exposure or dressing

The physician decides on the procedure and the nurse is responsible for seeing that the necessary equipment and supplies are at the bedside of the patient. Routine supplies include an electric suction apparatus, oxygen apparatus with a nasal catheter, a tracheotomy tray, venesection tray, sterile polyethylene tubing, catheterization tray with Foley catheters, sterile tubing and bottles for collecting urine, a dressing cart with sterile dressings and instruments, tubes for blood samples for both chemical analyses and cross matching of blood, and tubes to take initial cultures for determining presence of bacteria on the burn wound.

If possible, a patient should be weighed before he is placed in a bed or on a Stryker or Foster frame. Sedation is given only on the order of the doctor. Usually it is given intravenously because of the uncertainty of the rate of absorption in severely burned patients when administered subcutaneously. Patients who previously have been actively immunized with tetanus toxoid receive an additional 0.5 ml of tetanus toxoid. Tetanus antitoxin is indicated in patients who have not had active toxoid immunization, and a minimum of 3,000 international units should be given. Many people have a sensitivity to this serum product; therefore, preliminary sensitivity testing is necessary.

Prophylactic antibiotic therapy is administered for the first 3 to 5 days. Penicillin and streptomycin sulfate are generally used unless contraindicated by an idiosyncrasy; these drugs are quite effective in controlling β hemolytic streptococcal (group A) infections. Broad spectrum antibiotics may be used preferably those administered intramuscularly or intravenously. After the first 3 to 5 days, antibiotics are given only on the basis of wound culture and organism sensitivity tests.

NECESSITY FOR FLUID REPLACEMENT

A number of formulas have been devised to determine the types and amounts of fluids required in the *resuscitation of burn patient*. The water, colloids, and electrolytes that have been lost from the circulatory system by the development of edema or actual loss of fluids in the region of the burn wound must be replaced. Shock is associated with this profound loss and imbalance of body fluids and electrolyte.

The Brooke fluid formula is used at the Surgical Research Unit as a guide to proper resuscitation (fig. 2). The formula estimates the fluids required for the first 24 hours following thermal injury. From the 4th to the 48th hour the amount of colloids and electrolytes given is about one half of the amount administered during the first

24 hours plus the full amount of a 5 percent dextrose and water solution (2 000 ml) This formula is only a guide and modifications in the kinds and amounts of fluids to be given will be made by the medical officer when indicated by the clinical response of the patient

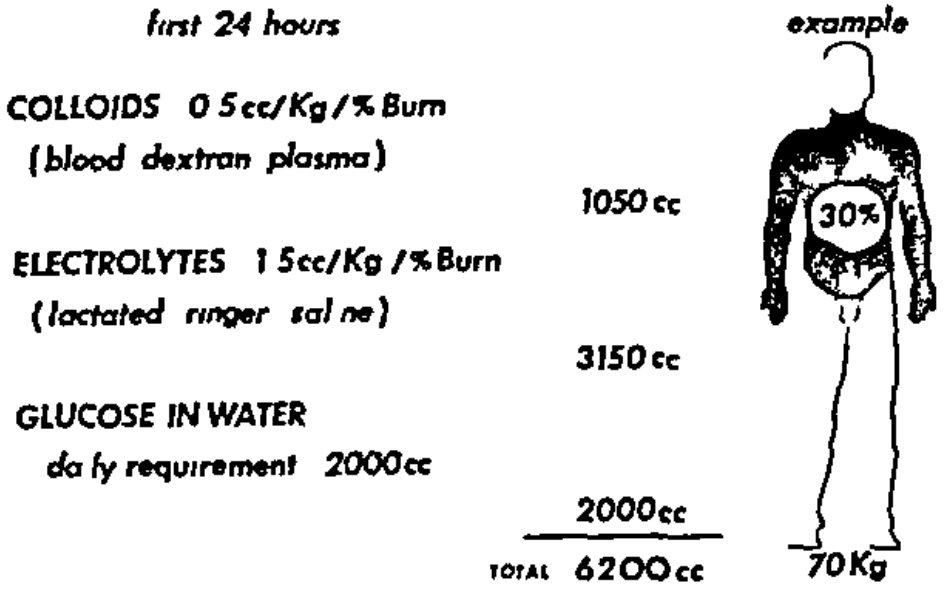


Fig Application of the Brooke fluid formula for patient weighing 70 kilograms (154 pounds) and suffering burns covering 30 percent of the total body surface

The rate of administration of the required fluids is very important and this is primarily the responsibility of the nurse (fig 3) The fluids commonly used are blood dextran plasma lactated Ringer's solution isotonic saline and 5 percent dextrose and water Other medications that may be added to one of these solutions include antibiotics vitamin preparations and potassium chloride

After the first 48 hours the doctor usually orders fluids for a 24 hour period The day nurse is responsible for mixing the solutions since most of the orders generally are given in the early part of the day She must know which of the antibiotics will mix in each intravenous solution because a fluid must be discarded if it becomes cloudy or contains particles in suspension After each solution is mixed the nurse writes on the label of the bottle the name of the patient date and contents Usually the fluids are given in divided dose The bottles are kept in the refrigerator until needed only if antibiotics have been added to the solution

DETERMINING ADEQUATE RESUSCITATION

The adequacy of resuscitation is best indicated by the level of urinary output because a patient sustaining burns of his arms and legs cannot have his blood pressure taken and other criteria for the diagnosis of shock may not be available For these reasons, an indwelling catheter is inserted as soon as practicable Urinary output is measured and recorded at hourly intervals A patient whose output is maintained between 30 and 50 ml per hour is being resuscitated satisfactorily An output below or above this range is often an indication for a change in the rate of administration of fluids

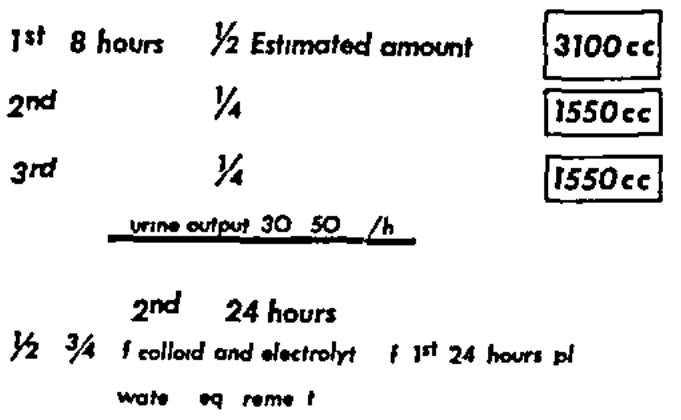


Figure 3 The rate of administration of required fluids showing the proportions to be given during the first 8-hour portion of the first 24 hours of the second 24 hours and of the third 24 hours The amounts appearing in the boxes are based on the example patient in figure 2

Because fluid replacement is extremely important in the early management of thermal injury it is essential that members of the nursing staff know the signs and symptoms of fluid deficiency such as thirst vomiting confusion tachycardia and decreased output of urine When some combination of these signs appears the nurse must notify the doctor in order that necessary changes in the resuscitative regimen may be made

If fluids are given too rapidly pulmonary edema may occur Fluid overload may be evidenced by a rise in blood pressure excessive urinary output rapid respiratory rate a bounding pulse or a decreasing cardiac rate

Every nurse must be alert to the danger signs of either deficiency

or excess of fluids She must keep the medical officer informed of significant variations in order to give the patient the best chance for recovery Unless a nurse understands the physiologic changes that occur in the body of the patient she is unable to follow the medical officer s instructions carefully and intelligently

An intravenous lifeline is simply a means of getting blood and other fluids into the body It is best to establish this route of infusion in one of the superficial veins by the use of a venous cutdown and polyethylene tube If this procedure is precluded by occlusion or thrombosis of these vessels as a result of the thermal injury it becomes necessary to secure this infusion route by inserting a femoral catheter The medical officer does this by inserting a 14 gage needle through the skin into the femoral vein at the groin A measured length of polyethylene tubing is then threaded through the needle to the level of the inferior vena cava When the needle is removed the polyethylene tubing is left in place The end of the polyethylene tubing is attached to an 18 gage blunt needle A small piece of tongue blade sufficiently long to overlap the junction of the tubing and the needle is taped to the blunt needle to prevent its cutting the tubing

The dressing around a femoral catheter is changed as it becomes soiled The nurse must be careful not to cut the polyethylene tubing while changing a dressing A femoral catheter should not be kept in the same vein longer than 7 days because the incidence of thrombosis of the vessel rises rapidly after that time If the tubing seems to be clogged a nurse may irrigate it with 1 to 3 ml of sterile isotonic sodium chloride solution

The nurse keeps a record for each patient usually on a 5 by 8 inch card and on this notes the daily schedule of intravenous fluid to be given after having calculated the time for giving each dose during the 24 hour period in order to distribute these fluids evenly over that interval Such a record enables the nurse on each shift to change the bottles and give the proper solution at the designated time

An indwelling catheter (Foley) is usually inserted if a patient has sustained a burn covering 20 percent or more of his total body surface A catheter permits hourly measurement of the patient s urinary output without lifting him onto a bedpan The Foley catheter is irrigated every 6 hours with a sterile isotonic sodium chloride solution to keep it free of sediment A Y shaped glass connector is attached to the catheter and to the rubber tubing from the solution bottle to facilitate this procedure Every 6 hours 100 ml or more of solution is run into the catheter and allowed to drain into the drainage bottle containing the urine An accurate recording of the amount of irrigating solution is necessary to determine the true urinary out

put Between irrigations, the tubing to the solution bottle is clamped The solution and tubing remain hanging on an intravenous standard by the patient s bedside until the necessity for irrigation no longer exists

Indwelling urinary catheters are changed once a week This change may be quite painful If urine is not draining from the catheter, the nurse should check to see whether any clots or purulent plugs are interfering with the flow The medical officer is notified whenever irrigation fails to remove an obstruction

TREATMENT OF SPECIFIC AREAS

A tracheotomy is usually required in patients with burns of the face and neck, direct burns of the upper respiratory tract, or burns occurring in a closed space with inhalation of noxious and irritating fumes and smoke Within the first few hours after thermal injury of the face and neck, marked and severe edema occurs Edema may prevent a patient from opening his lips Vomiting frequently accompanies severe burns and when a patient is unable to eject the vomitus the best method of preventing aspiration is by a tracheotomy

Inhaled flame or steam will cause edema of the entire tracheobronchial tree or of the larynx A tracheotomy will bypass an obstruction in the larynx and help tracheobronchial toilette In such instances, the tracheotomy is a lifesaving procedure Following this procedure, a 4 by 4 inch, damp sponge must be kept over the tracheotomy opening at all times to help keep the air moist The trachea is suctioned periodically through the tracheotomy tube to keep it free of secretions

The inner cannula of the tracheotomy tube is removed and cleansed thoroughly at least once every 8 hours The physician changes the tube and cannula every 3 days Local care of the tracheotomy wound includes frequent cleansing with saline solution and the application of any dressing prescribed

Even though a patient does not undergo a tracheotomy he must be observed as carefully as one who does Respiratory obstruction or pulmonary edema may occur at any time during the initial treatment period A tracheotomy set should always be on the ward ready for use

The electric suction machine used with tracheotomies is connected by means of a Y shaped glass connector to a No 12 plastic catheter One arm of the Y is left open The catheter is inserted into the depths of the trachea before suction is applied Suction is obtained when the nurse holds her finger over the open arm of the Y connector The catheter is rotated gently while it is being removed This minimizes

the damage to the mucous membrane of the trachea Long continuous suction must be avoided as this will suck out the air and result in an inadequate supply of oxygen The catheter is kept in a bottle containing a 1 5000 solution of benzalkonium chloride between aspirations A similar catheter is used if suction must be obtained through the nose

Oral hygiene in severely burned patients is a function of the nursing staff It must be carried out frequently and effectively in order to prevent a stomatitis or associated infection of the oral structures A suction machine is used to suck out the cleansing solution and to prevent the patient from strangling when he is unable to turn his head to allow fluid to run out of the side of his mouth

Care of the eyes is particularly important when a patient sustains burns of the face Sometimes he will not be able to open his eyes during the early period because of extensive edema During the course of therapy a patient who has had his eyelids burned may develop an ectropion or eversion of the eyelids resulting in exposure of the cornea The cornea must be kept moist and covered with a protective ointment to prevent ulceration and infection Moistening is maintained by using a bulb syringe to irrigate the eye with copious amounts of a saline solution every 4 to 6 hours After each irrigation an antibiotic ophthalmic ointment is applied If a patient is scheduled for an operative procedure that necessitates a bandage over his eyes he should be informed beforehand to prevent any psychologic reaction When his eyes are bandaged it is wise to explain any procedure prior to initiation of the treatment as this will help allay any apprehension

Narcotics or sedatives are given for relief of pain and excitement during early postburn therapy It is wise however to discontinue their use at the earliest possible time because a patient tends to rely on a narcotic as a means of escape from the realities of his injury Frequently patients who have been severely burned (burns covering 30 percent or more of the total body surface) are disoriented and occasionally hyperactive At such time a mild sedative may be sufficient to produce calmness These reactions are generally controlled by the use of a barbiturate given four or more times a day

OPERATING ROOM PROCEDURES

A burn patient may undergo numerous operative procedure with or without anesthesia including debridement dressing change and skin grafting The initial operative procedure may be carried out shortly after a patient sustains a thermal injury It may consist

only of washing the burned area with surgical soap that contains hexachlorophene and then rinsing with saline solution, or it may also include debriding the wound surfaces At this time, the doctor must decide whether to use the exposure treatment or occlusive dressings on the burn His decision will depend on a number of factors

Second degree burns are routinely treated by the exposure method Most third degree burns are also exposed because this method gives the best results while minimizing infection, cost of materials and supplies, and the amount of nursing care required

If full thickness burn involve the dorsum of the hand, occlusive dressings are generally used in order to maintain the hand in a position of function during the process of treatment If the burned area is excised within the first 48 to 72 hours after injury and early skin grafting is to be undertaken, then the burn wound is dressed to prevent both the formation of the eschar and the entry of any bacteria

Whenever dressings are used, they are changed on a 3 day schedule, both prior to and after skin grafting When eschars are being removed in preparation for grafting procedures, saline dressings are used to hasten the cleansing of the burned area Debridement of the burn wound is carried out at the time of each dressing change It includes manual removal of the crusts and eschar and the mechanical debridement resulting from washing the area thoroughly with soap and a sterile saline solution

Dressings used in the management of burn patients are massive, occlusive dressings that are made in advance to fit various areas of the body, such as a thigh, upper arm, an entire leg, or the lower portion of a leg Such dressings also immobilize an extremity Before applying these dressings the region is covered by fine mesh gauze that may be dry or impregnated lightly with petrolatum or an antibiotic ointment Fluffs are placed on the areas as padding and then the heavy occlusive dressings are applied The dressing is held in place by wrapping it with stretchable crinkled gauze bandage

Skin grafting provides coverage of a burned area and helps prevent the entry of bacteria that may cause septicemia Grafting also serves as a functional and cosmetic coverage The skin used is either autograft or homograft or a combination of the two Prior to the last decade donor sites were covered with a layer of fine mesh gauze impregnated with petrolatum or some other ointment, after which occlusive dressings were applied Occasionally such treatment resulted in infection and the conversion of the donor area to full thickness injury (comparable to third degree involvement) and subsequent hypertrophic scar formation that was not only difficult to heal but unsightly

In our unit donor sites are treated routinely by the exposure method The site is covered with a single layer of dry fine mesh gauze as soon as the skin is removed Warm wet pads are then placed over donor areas to control the bleeding The pads are removed after the operative procedure is completed The donor site is left open to the air and it dries and forms a crust The drying process is often accelerated by the use of a floor lamp having a flexible adjustable arm and a 60 to 100 watt bulb placed approximately 12 inches from the donor site If the donor is still under anesthesia a fan may be used but this method is extremely painful when the donor is conscious

During the first 24 to 48 hours when the crust is forming the donor area generally is very painful and a narcotic may be required at relatively frequent intervals Donor areas are not painful after the dried crust forms Since the donor has a tendency to chill he must be protected from drafts Hot water bottles may be placed at his feet and blankets may be used for covering him but it is imperative that the blankets and bed linen do not touch or cover the donor sites This can be accomplished by using a bed cradle

It is not difficult to keep an adult in a position that will expose a donor site When large areas such as the chest or back are to be exposed the donor may be placed on a Stryker frame and turned frequently to facilitate the drying process It is difficult to keep children in a position for exposure hence they must be restrained in some comfortable position in order to allow their donor sites to dry

Every donor is cautioned against picking at the donor site If the fine mesh gauze is torn loose infection may occur on the donor wound As healing progresses the fine mesh gauze becomes loosened around the edges and it is trimmed off to prevent the patient from pulling at it Usually the entire layer of gauze has been removed by the end of the thirteenth or fourteenth day and the donor site is healed

ROUTINE THERAPY

Patients sustaining minor burns of only one surface of the body may be cared for in a hospital bed If the burns are extensive or involve the trunk in combination with the perineal region and extremities the patient is best cared for on a Stryker or Foster frame Such frames afford several advantages 1 The patient is more comfortable He does not have to be lifted except for weighing

The nursing care is difficult A patient can be handled very carefully by three or four members of the ward staff when on a

frame in spite of dressings on his trunk or heavy, bulky dressings on his arms or legs (fig 4)

A special board was devised by our unit (fig 5) because the regular arm board of the older model of the Stryker frame is not long enough and is not properly positioned Arms and legs may be extended in any position and are usually elevated After the boards are in place pillows are used to give comfortable support

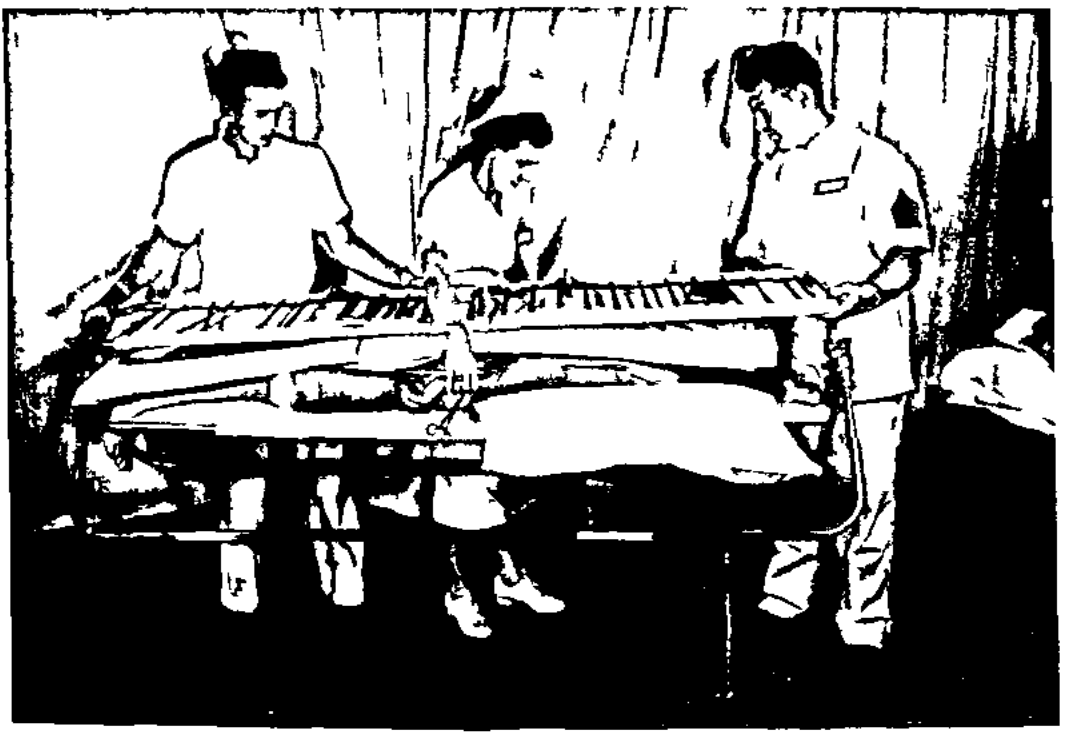


Figure 4 Ward personnel ready to turn a patient on a Stryker frame to a face up position

When a patient on a Stryker frame is turned on his abdomen he must be observed closely to see if edema of the face occurs Any indication of this requires immediate turning of the patient onto his back During the initial period a patient may not tolerate the face down position for the length of time desired and the turning schedule must be adjusted If a patient is able to use his hands and feed himself he can do it quite satisfactorily while in a face down position If he must be fed by someone else it is easier to feed him when he is lying on his back The turning schedule therefore, is planned to enable the patient to be in the face up position at mealtimes

The medical officer may order wet dressings for any one of several reasons They accelerate the removal of the eschar in third degree burns they help to prepare a granulating surface for application of

a skin graft and they aid in the control of infection on the surface of the burn A soak or wet dressing however must be changed every 3 to 4 hours otherwise it becomes a fertile surface for the growth of bacteria Normal saline Zonite (sodium hypochlorite) solution diluted to the desired strength or sterile distilled water are some of the solutions that are used as soaks

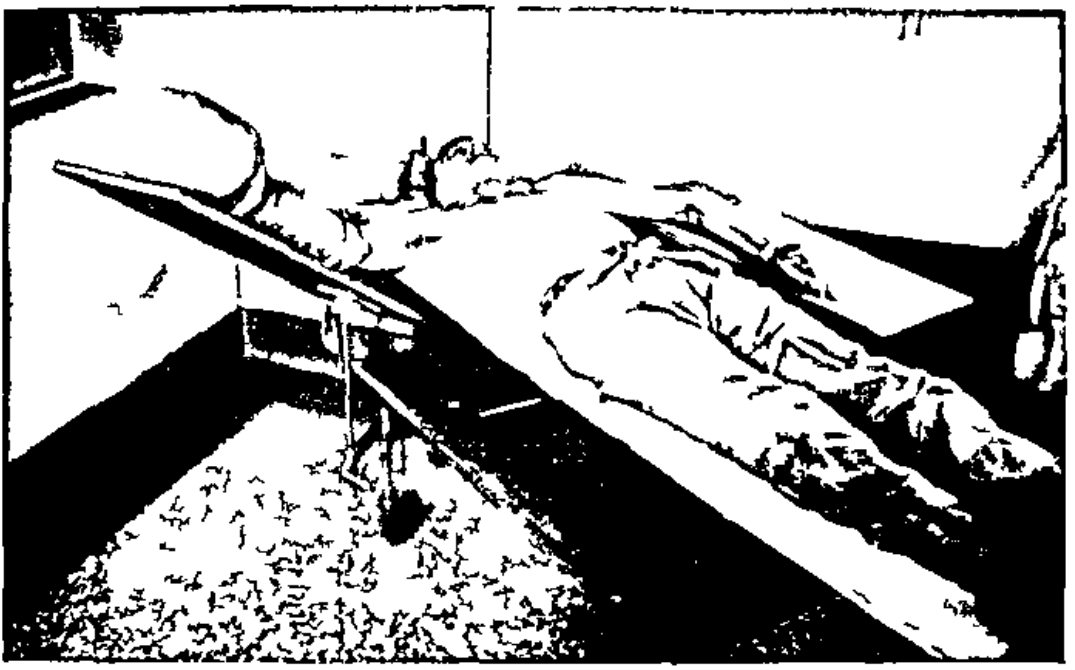


Figure Sponge lumbar litter hand dressing Stryker frame pad and mineral oil ppt

In applying wet dressings the nurse prepare a sterile tray (fig 6) that consists of a basin containing the solution prescribed a bulb syringe and dressings in sizes 4 by 4 4 by 8 and 16 by 16 inches (the size selected is determined by the area of the burned surface to be covered) Sterile scissors and thumb forceps also are placed on the tray The nurse wears a mask and sterile gloves when she applies or changes the dressings The temperature of the solution may vary from 90 to 100 F depending on the reaction of the patient when it is applied

Before attempting to remove a dressing the nurse wets it with the solution using the bulb syringe in order to soften any adherent substance and thereby decrease the discomfort to the patient After the dressing is removed the area is debrided using forceps and scissors to remove *dust or necrotic tissue* *If bleeding occurs it can* usually be controlled by applying Gelfoam Should the bleeding persist it may be necessary for the medical officer to use sutures

Dressings are kept wet by applying the solution with a bulb syringe until time for the next dressing change

The removal of dressings, debridement of the burn wound and application of dressings are a time consuming procedure If the burned area involves just the trunk or one side of the body, a nurse can perform this procedure alone If the area involves extensive wounds on the arms or legs, however she will need an assistant to hold or move an extremity while she debrides the wound and applies fresh wet dressings Some patients complain of discomfort and pain when wet dressings are first applied, and therefore elixir of phenobarbital frequently is given prior to the procedure In more severe cases, the medical officer may prescribe a narcotic

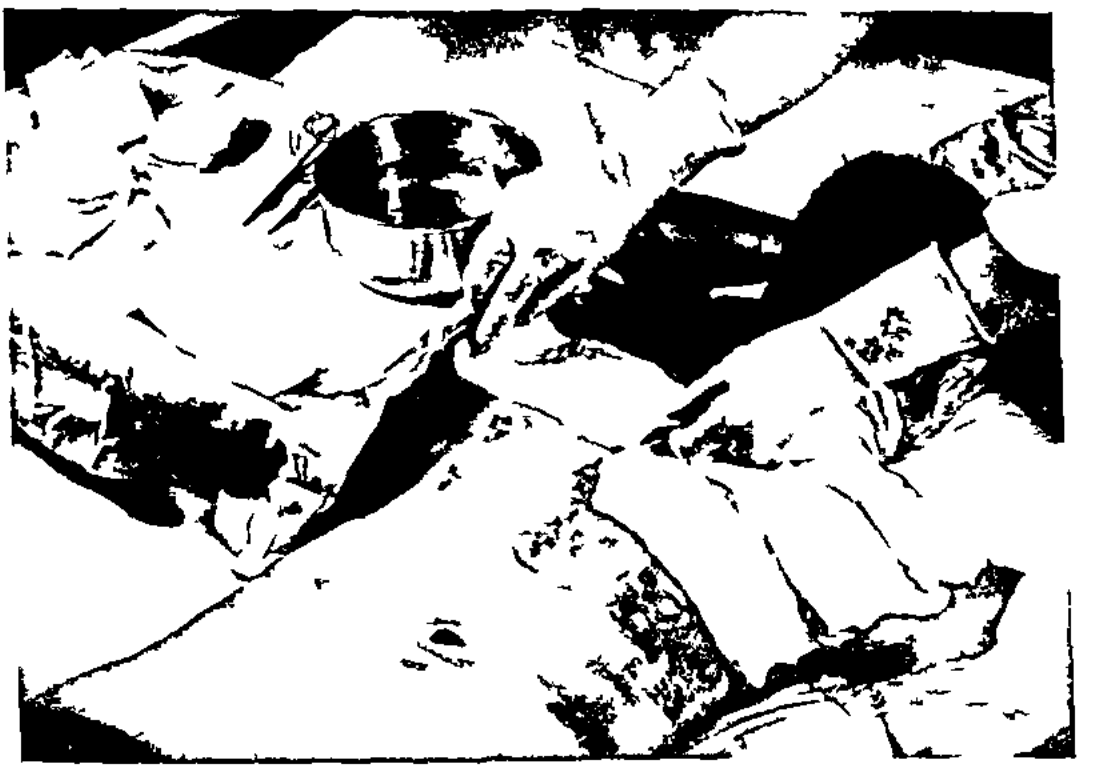


Figure 6 Application of wet dressings requires sterile technique After dipping into the solution a fully wrung out dressing is applied directly to the burned area When a 16- by 16- inch dressing is applied initially to a wound difficulty in removing it may cause the patient unnecessary pain

All burn patients complain of severe itching after their wounds begin to heal This is often helped by antihistamine drugs which are administered four to six times daily An ointment containing cold cream olive oil and lanolin made by our pharmacist is applied to any area of the burn that has healed This ointment minimizes

scaling from healing areas affords temporary relief from itching softens these areas and increases their pliability

A patient who has sustained severe thermal trauma quickly burns up food stored in his body and depletes the protein in his tissues It is essential therefore that he be given an ample high caloric high protein diet or formula Frequently a patient does not wish to eat or will take only small amounts of food In this case he should be fed smaller amounts prepared in an appetizing way If he will not eat voluntarily when his gastrointestinal tract is functioning properly oral intake is maintained by the use of a nasogastric polyethylene tube The liquid feeding given on our ward is either a formula or a homogenized low residue diet consisting of high caloric high protein elements Multivitamin capsules are routinely administered to patients who can take them orally If a patient must be fed by tube vitamin capsules are blended with the homogenized food

PSYCHOLOGIC FACTORS

In the management of burn patients it is best to separate each age group and sex If it is not possible to have separate rooms or cubicles movable screens may be used In the case of children however such a substitute will not prevent one child from disturbing the other patients on the ward

Every burn patient has his own problems both physically and psychologically The nursing staff must always demonstrate patience tact tolerance and understanding during this difficult readjustment A patient when first hospitalized is unable to care for himself and becomes completely dependent upon others Unless he is encouraged to help him elf and perform such tasks as brushing his teeth and feeding himself he will remain dependent upon others

A physiotherapy department is an essential part of any center for the management of burn patients and physiotherapy should be initiated at the earliest practical time In our ward a patient begins simple exercises with the help of the physiotherapist who comes every day When a patient is able to be placed in a Hubbard tank or in a whirlpool apparatus he is taken to the physiotherapy treatment room on a Stryker frame a litter or in a wheelchair His ambulation usually is regulated by the physiotherapist under instructions from the medical officer in the physiotherapy department When it is advisable for a patient to begin walking his legs are wrapped in elastic bandages from ankle to thigh He is not allowed to walk without these bandages but they may be removed when he is lying in bed

Teaching a patient to wrap his own legs and to care for himself will develop his self reliance

Our hospital provides the services of an occupational therapist, who is on the ward daily Various types of handicraft are furnished and the patient is assisted in making some article The muscle coordination required in such therapy helps to restore maximum function to his fingers, wrists, and arms

Personnel of the American Red Cross assist the patients and members of their family in any way possible Rooms or apartments are provided for relatives, transportation is arranged when needed, and assistance is given in working out financial problems They endeavor to make a patient's relatives comfortable during their visit Other Red Cross activities include games and entertainment on the ward Patients are taken to educational, recreational, and sports events on the post and in the city to help keep them interested Indirectly these services contribute to the patient's peace of mind and sense of well being

SUMMARY

Initial therapy is determined by the degree and depth of the burn and by the percent of the total area of body surface involved Early procedures include treatment for shock by replacement of fluid losses and institution of prophylactic antibiotic therapy

The Brooke formula serves as a guide to resuscitation After the medical officer determines the types and amounts of resuscitative fluids necessary the nurse is responsible for mixing the solutions and seeing that they are given in the proper proportion and at the designated intervals

In order to supply blood and other fluids to a thermally injured patient an intravenous lifeline must be established In patients with extensive burns this may necessitate the insertion of a femoral catheter

Respiratory obstruction or irritation may occur during the early period following the injury Tracheotomy is often a lifesaving procedure when a patient has sustained burns of the face, neck, or upper respiratory tract Edema may be extensive when the face is burned; and special care of the eyes is mandatory Narcotics are indicated for relief of pain and excitement

Routine procedures for thermally injured patients include débridement dressing changes, and skin grafting, with or without use of the In An occlusive dressing on burns of the hand helps to maintain a po

sition of function Occlusive dressings are changed on a 3 day schedule both prior to and after skin grafting

The exposure method of treatment of donor sites is preferred A patient must be cautioned against picking at the fine mesh gauze covering the area The early formation of a crust prevents entry of bacteria that might convert a donor area into full thickness skin injury Healing of a donor site usually occurs by the end of the second week

Patients sustaining extensive burns or burns involving the trunk in combination with an extremity are most easily cared for on a Stryker frame Wet dressings are applied to accelerate the removal of the eschar in third degree burns to prepare a granulating surface for grafting and to control infection on the surface of a burn wound Because of depletion of protein stored in body tissues supplemental food is required When a patient will not eat a sufficient amount a low residue diet consisting of high caloric high protein elements is homogenized in a food blender and given through a feeding tube Vitamins may be blended in this food

The difficult readjustment phase challenges a nurse s patience tact and understanding A burn patient is unable to help himself at first but he must be encouraged to perform simple tasks to regain his independence Both physical and occupational therapy aid him in regaining motion of muscles and restoring them to maximum function Personal and recreational services provided by the American Red Cross contribute greatly to a patient s welfare during the long period of hospitalization

REFERENCES

1 Pulaski E J and Tennison C W Rules for Printed at meeting of the National Research Council Washington D C November 2 1950

Artz C P and Sobof H S Modern concepts in treatment of burns *J A M A* 149 411–417 Oct. 1 1950

3 Artz C P and Reiss E *The Treatment of Burns* W B Saunders Co Philadelphia Pa 1947 pp 17 18 90–100 103–10

4 Plum F and Dunnill M F Technics for minimizing traumatic thrombosis of bronchial tree after tracheotomy *Brit J Med* 54 193–200 Feb 1956

5 Artz C P and MacMillan B G Treatment of burns of difficult area *Am J Surg* 91 1 0 Apr 1956

6 Dunn J H Jr Artz C P Reiss E and Asscher W H Practical technique in management of burn patient *Am J Surg* 86 713–17 Dec 1953

7 Hunter D A Hunter B and Cox S Adaptive problems and mechanical injury in burned patients *Psychiatry* 16 1 0 Feb 1953

Transferring a Prosthodontic Restoration Between Two Hanau Articulators

MAJOR JOSEPH J BARONE DC USA
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MODEL H HANAU ARTICULATORS are not identical[1] Occlusal disharmony is introduced when correctly mounted casts with occluding teeth are directly transferred from one Model H Hanau articulator to another by merely transferring the upper and lower mounting rings[2] In prosthetic dentistry the most commonly used method is to complete all clinical and laboratory phases of the restoration on one instrument but this is not always possible especially in the armed services where transportation of the larger articulators between stations is sometimes difficult In preference to the use of arbitrary articulator mountings on their instrument the manufacturer has suggested a method of transferring a complete denture prosthesis from one Model H Hanau articulator to another An application of this method specifically for use in the armed services will be outlined This procedure is recommended by the authors to encourage the use of face bow registrations in conjunction with available semi adjustable articulators

The transfer method for use between two articulators begins with a face bow registration and mounting of the upper cast The use of the arbitrary center of rotation instead of the kinematic center of rotation is suggested because of simplicity of equipment expedience, and accepted accuracy Furthermore in a study of 70 patients[3] over 90 percent of the kinematic centers of rotation were found to lie within a 5 mm radius of the arbitrary centers of rotation If any prosthodontic restoration having balanced occlusion on the articulator is to be equally balanced and functional when inserted in the mouth, it is

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Fr Walter Reed Army Institute of Research and National Bureau of Standards Washington DC

essential that the factors and records guiding centric lateral and protrusive movements be oriented to the same opening axis The few minutes required to obtain a face bow record will enable the operator to more closely approximate on the articulator the anatomic location and/or relationship of the maxillas to the opening axis of the mandible In this way the patient will derive the maximum benefit of the articulator of choice Thus the dentist will more closely achieve functional balanced articulation in the mouth Omitting the face bow registration entirely would decrease the precision of an otherwise systematic procedure when using a semiadjustable solid axis articulator

The detailed description that follows will be limited to the fabrication of complete upper and lower dentures but may be readily applicable to other types of prosthodontic treatment This method involves the use of two Model H Hanau articulators one located at the dental clinic the other at the central dental laboratory It is recommended that the two articulators be identified and reserved for one patient but not necessarily left idle when unoccupied by these dentures

TRANSFER TECHNIC FOR COMPLETE DENTURES

Dental Clinic The master cast base plate and occlusion rims for each arch and the centric relation registration of the upper cast to the lower cast by means of face bow transfer and interocclusal registration material The lower cast is then mounted on the articulator The interocclusal registration material is then removed from the lower cast and the upper cast is mounted on the articulator by means of the face bow transfer The lower cast is then secured to the articulator with sticky wax or plaster and the entire articulator assembly is packaged for transfer to the central dental laboratory The lower cast is removed from the articulator and the upper cast is removed from the face bow transfer The face bow transfer is then secured to the articulator with sticky wax or plaster and the entire face bow transfer assembly is packaged for transfer to the central dental laboratory

Central Dental Laboratory The face bow transfer is secured to the articulator Model H Hanau articulator The lower cast is then secured to the articulator with sticky wax or plaster and the upper cast is mounted in centric relation to the lower cast using the interocclusal record The face bow transfer is then removed from the articulator and the upper cast is secured to the articulator with sticky wax or plaster and the entire articulator assembly is packaged for transfer to the dental clinic

laboratory articulator The laboratory technician positions the anterior teeth according to the lateral contour of the occlusion rim and sets the posterior teeth into positive centric occlusion for trying in The lower cast is then removed from its plaster mounting and returned to the dental clinic along with the upper ring and cast and the trial denture The plaster lower mounting and ring are identified and retained by the central dental laboratory

Dental clinic At the time of the appointment for trying in the dentist at the clinic will follow either one of two avenues clinic step A or clinic step B

Step A If the original articulator mounting is correct and the esthetic arrangement of the anterior teeth satisfactory the dentist obtains a protrusive interocclusal record and adjusts the condylar elements on the articulator The condylar settings obtained are recorded on the upper cast and also on the appropriate patient record for later use on the central dental laboratory articulator Direct transfer of the condylar settings is suggested here because the difference that would occur from properly transferring the same condylar settings between the two articulators can be minimal and correction made when the dentures are inserted Large differences in condylar recording from the same patient have been reported The trial denture without the lower mounting ring are now returned to the laboratory with instructions relating to the fabrication of the completed dentures

Step B If the original articulator mounting is incorrect the dentist obtains a new centric interocclusal record at the desired occluding vertical dimension He then remounts the lower cast on the articulator verifies the new mounting and completes the esthetic arrangement of the anterior teeth A protrusive interocclusal record is then accomplished and adjusted on the articulator The condylar settings are recorded on the upper cast and on the appropriate patient record A transferable centric interocclusal record with lower posterior teeth removed is then accomplished on the articulator of central dental laboratory use The trial dentures the upper cast and mounting the lower cast and the transferable interocclusal centric record are now returned to the central dental laboratory along with special notification of the new mounting

Central dental laboratory If clinic step B is followed a new lower mounting is made in the laboratory using the corrected centric interocclusal record If clinic step A is followed the central dental laboratory uses its original retained lower mounting to complete the dentures Clinic steps A and B have been outlined so that in either event the central dental laboratory can complete the fabrication of the dentures within the usual two round trip mailings

Using the prescribed protrusive readings the necessary settings are made on the laboratory articulator and the posterior teeth are arranged for balanced occlusion under close supervision of the central dental laboratory officer The dentures are then waxed up, invested processed and polished Corrections for occlusal processing errors are made on the central dental laboratory articulator before finishing and polishing

The finished dentures are returned to the dental clinic with an index or single upper mounting which is made after correcting the processing error This facilitates remounting the dentures at the time of insertion

essential that the factors and records guiding centric lateral and protrusive movements be oriented to the same opening axis The few minutes required to obtain a face bow record will enable the operator to more closely approximate on the articulator the anatomic location and/or relationship of the maxillas to the opening axis of the mandible In this way the patient will derive the maximum benefit of the articulator of choice Thus the dentist will more closely achieve functional balanced articulation in the mouth Omitting the face bow registration entirely would decrease the precision of an otherwise systematic procedure when using a semiadjustable solid axis articulator

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TRANSFER TECHNIC FOR COMPLETE DENTURES

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Tl l w t i p t d f m its key d pl te mountl g Thi pla te l u t will be l b led d retained t th d tal cli l t e rec l f th g l ti lat m ti g

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C nt l d t l lab t y Th ipe a t it m t g i g i ec d t th e t l d t l l b t ry Mod l H Han ti ul t Th i ci l gi d i i t fi l witl th ipe rm f thl a ti l t d t t i imi y e in dj t th l l tti gs U i th ign l ent ic i t ccln l reco d ec ed f m th l t t ll i th l ca t th n m ted th

The Army Medical Service Its Achievements, Objectives, and Plans

LIEUTENANT GENERAL LEONARD D HEATON MC USA
SURGEON GENERAL OF THE ARMY

IT IS A GREAT HONOR and distinct privilege for me to initiate the Surgeon General's meetings for this year of 1960 Our plan is to present at the 4 meetings scheduled this year subjects of major concern and interest to members of each corps of the Army Medical Service It is my hope that all members of the Army Medical Service in this area will avail themselves of the opportunity to attend these meetings and benefit thereby

I have served in the Army Medical Service for over 33 years mostly in a professional and executive capacity It is inevitable that over this long period I should have formulated some definite concepts as to its major objectives and the road that we must take to achieve these objectives Accordingly I propose to discuss items that are of interest to all of us our progress to date and our plans hopes and outlook for the future

Because of our many duties and responsibilities it is perhaps helpful to restate—in these opening remarks—the broad objectives of the Army Medical Service in order that our mission may be placed in a better perspective Our objectives can be summarized as the 5 pillars of military medicine

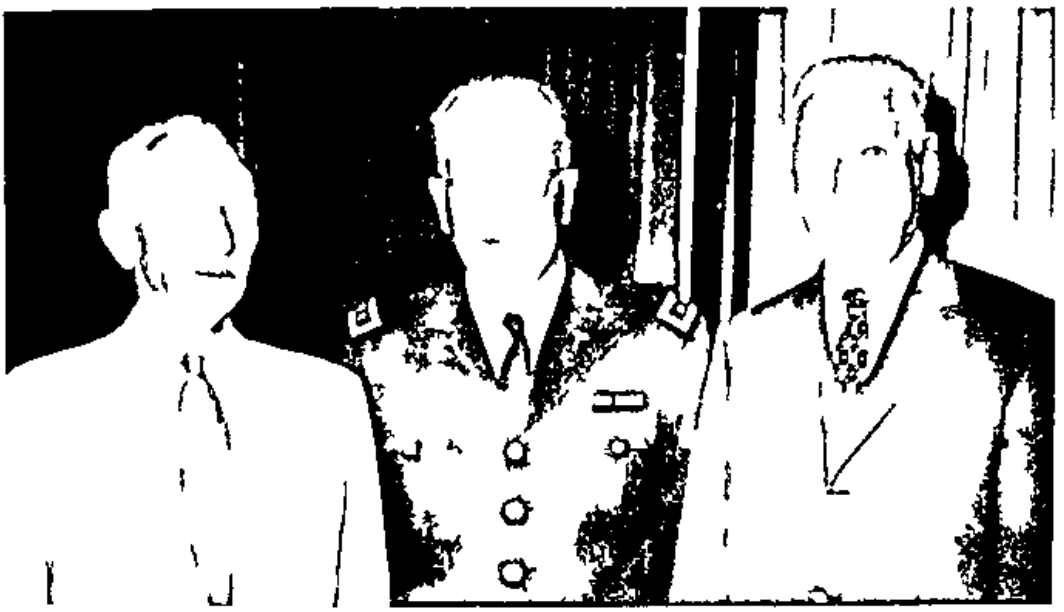
1 The practice of medicine including the art of medicine as well as curative and preventive medicine
2 Field medicine—combat readiness
3 Medical education
4 Medical research
5 Medical administration

The mission of the Army Medical Service is to maintain the health of the Army so as to conserve its fighting strength and to prepare in

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Text of an address to Army Medical Service officers presented 15 October 1959 at Walter Reed Army Medical Center Washington D C

time of peace for mobilization in time of war This mission is clear and single in purpose but the instruments and mechanics for accomplishing it are multiple and complex The Army Medical Service is concerned with selection of the physically and mentally able soldier prevention of disease and injury evacuation and care of the sick and wounded research and development training logistics management and organization It involves men and women of diversified skills and experience many types of facilities equipment materiel and services and of course considerable sums of money It *must* provide complete medical service in peace and be prepared to provide it under all foreseeable conditions in war



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No operation requires more attention to detail places more reliance on team work or demand a higher degree of perfection from every element of the organization and every facet of its operation than the Army Medical Service Here we deal with the individual both as soldier and human being in an area of greatest concern to himself his family and the Nation—his health and perhaps his very life It is one operation in which we shall never achieve our ultimate goal for we cannot be satisfied with anything less than perfection

The Army Medical Service is justly proud of its progress to date

We are proud of the men who made great contributions to the art and science of medicine—Letterman Tripler Walter Reed Brooke and so many others who left us this great heritage We are proud of our record in maintaining the health of the Army the constantly shrinking noneffective rate We are proud that patients in Army hospitals receive professional care equal to the best in civilian medicine We are proud that the top graduates of our medical schools seek training in Army hospitals in greater numbers than we can accommodate We are proud of our monkeys in space True there are some things of which we are not so proud such as the dilapidated buildings we call hospitals but more of this later Above all we are proud of the way the Army Medical Service has met and overcome the problems and obstacles placed in its path of progress For all these achievements have been accomplished despite wars hot and cold despite constant turnover of personnel and despite shrinking budgets

In assuming the office of the surgeon general I am taking over a going concern that is doing an excellent job today and has the momentum for doing a better job tomorrow I know that the problems we face in this infant nuclear age are growing in scope and intensity I feel confident that in line with the tradition of the Army Medical Service we will square up to these problems and successfully resolve them I consider it my duty to see that the progress of the Army Medical Service is not only continued but accelerated during my period in office Much can be accomplished even within a 4 year period if we understand our problems have a definite realistic goal in sight and together as a team are willing to work for it

I said before that in the Army Medical Service we can never be satisfied with anything less than perfection I am sure that all of us are devoted to the continuous improvement of the Army Medical Service The question each must answer for himself is how best he can serve this end The responsibilities of the surgeon general are numerous indeed ranging from daily operational actions to the broadest of policy decisions from signing routine correspondence to advising the Chief of Staff and the Secretary of the Army However there is one responsibility that looms above all others The surgeon general must direct the course of the Army Medical Service for his 4 year period of office—the operating philosophy of the Army Medical Service if you please He and he alone is responsible for that

Again I want to repeat that progress of the Army Medical Service can be achieved only by simultaneous improvement in every facet of its operation I have been a general surgeon and hospital commander long enough to know that no element of an operation is too

trivial to deserve proper attention But tonight I want to speak in broader terms and mention only a few of the problems upon which we must exert particular effort in the immediate future

CARE OF PATIENTS

Our major task in volume if not in importance is to take care of the sick and injured The most direct way to assure a good medical service in war is to build the best possible medical service in peace time I believe the American officer soldier and members of their families deserve the best possible care that can be made available in both peace and war First-class medical care is a matter not only of completely trained well motivated personnel but of adequate well-equipped facilities as well

I am deeply concerned about the slow progress we have been making in the replacement of our antiquated medical facilities which are inefficient to operate and not conducive to the best in medical care I refer not only to the woodshed type cantonment hospitals but also to those of even more ancient vintage such as Letterman and William Beaumont General Hospitals We are operating a total of 92 hospitals in CONUS Since World War II we have replaced 10 4 are currently under construction and 3 are funded and under design Of the 35 remaining 25 need to be replaced as a matter of urgency and necessity My plan and hope are to provide the Army with a system of modern permanent hospitals to raise the standard of medical facilities to be commensurate with that of the highest quality of medical care and to keep pace with the new gymnasiums permanent barracks and over all troop support construction program I believe that the sick soldier requires and deserves at least as adequate and attractive an environment as the well soldier I have initiated action through Headquarters Department of the Army to obtain an orderly replacement of hospital facilities over an 8 year period Similarly we need more rapid replacement of our Army area medical laboratories medical research facilities dental clinics dispensaries nurses quarters (these tie in with nurse procurement which needs stimulus) and enlisted men s barracks and I intend to apply energetic effort to these elements of the construction program

It is essential that the hospitals that are being built and that will be built in the future be equipped with the finest materiel that American ingenuity has devised It is equally important that the worn-out and obsolete equipment of our other operating hospitals be replaced with modern efficient equipment that will permit the full

use of the capabilities of our excellently trained professional personnel and will provide the proper basis for the maintenance of the highest standard of medical care in our hospitals A recent survey of our CONUS Army hospitals revealed that we are lacking equipment of the advanced design and technologic improvement that is considered an integral part of modern patient care The medical budget was so austere in the last few years that only about 4 percent of our direct budget money was available for replacement of worn-out and obsolete equipment and for all maintenance as well We have urgently requested that $4 000 000 be added to our obligational authority for this purpose We have made plans already for a modernization program in our hospitals which will include replacing our worn and obsolete equipment with that of advanced design and acquiring recently perfected specialized equipment for diagnostic and therapeutic procedures I deem it most essential that we keep pace with the new trends and technology

On the other hand I am quite pleased with the recognition our hospitals—both new and old—have received for the manner in which they are operated The Joint Committee on Accreditation of Hospitals has surveyed and accredited 42 United States Army hospitals in the continental United States We have a program also for the accreditation of our overseas hospitals So far 8 of these hospitals have been accredited I should like to emphasize that of all the Army hospitals considered by the Joint Accreditation Committee—both overseas and in the United States—not one has been rejected

Within the limitations of personnel and budget restrictions the Army Medical Service must continually broaden the scope of its services as advances in medicine surgery and allied fields develop For example a few years ago cardiac catheterization and open heart surgery were unknown and isotope laboratories were restricted to large research centers Today we have cardiac catheterization laboratories in 8 hospitals and open heart surgery is being done at 4 of our major hospitals Isotope clinics are actually operating or planned for all our teaching hospitals Our major facilities have fully equipped pulmonary physiology laboratories and even many of our smaller hospitals are able to perform pulmonary function tests which only a few years ago were strictly research tools

In the future we plan to extend isotope clinics and pulmonary physiology testing to other treatment facilities as rapidly as feasible and as trained clinicians become available we expect to have the capabilities of doing open cardiac surgery at most of our teaching hospitals in CONUS as well as in our overseas theaters

In the field of psychiatry the Army program continues to expand

preventive procedures designed to decrease instances of noneffective behavior Mental hygiene con ultation services have made a signifi cant contribution toward reduction of prisoner personnel Further intensification of these efforts that will involve an earlier recognition and identification of maladjustment problems will soon be implemen ted Army psychiatry has also expanded its efforts in the care and treatment of psychiatric inpatients with special therapy wards

Laboratory science has shared with other branches of medicine in the rapid developments of today A common focal point the labora tories serve all the specialties whose increasing complexities have combined to affect laboratory medicine perhaps more extensively than any other specialty The development of new tests has called for more complex instruments increased training of personnel and additional equipment and supplies not even thought of a decade ago Competent laboratory work must be done in adequate facilities with modern equipment by well trained technologists in keeping with the advances in the science of medicine It can no longer be relegated to inferior quarters or performed by any but the most capable physicians and allied scientists

We must recognize our responsibilities to the vast number of out patients who daily require such treatment at all of our Army Medical Service facilities This type of medical care must be of the same high standard as that given to hospitalized patients The Army has perhaps been slow to appreciate the advances in medicine that make it possible to treat an ever increasing percentage of patients by careful specialized outpatient or clinic care rather than by hospitalization

Many of you know that a committee in my office is currently ex ploring all avenues of possible improvement in this area to the end that our clinic patients will enjoy the equivalent superlative care now lavi hed on ho pitalized patients and will be afforded the same con tinuity of care and physician skill that is now possible in our leading civilian clinics

I am presently endeavoring to secure additional funds so that our Army specialists in many fields can not only visit our own installations in this country and abroad but can also explore the possibilities of reciprocal visits with our medical colleagues of many lands

MEDICARE

We must be ever conscious of our responsibility not only to the American soldier but to his family as well On 7 December of this year the Medicare program will complete its third year of operation By that date the Government will have paid out more than $200

000 000 for 800 000 civilian hospital admissions of wives and children of men in the uniformed services This money was almost equally divided between physicians and hospitals In addition on that date it is estimated that there will be nearly 40 000 cases for which bills will not yet have been submitted

Of the 800 000 civilian hospital cases for which the Government will pay in these 3 years about 410 000 are deliveries 70 000 are other obstetric cases 170 000 are surgical and 150 000 are medical cases But these figures do not cover the whole Medicare program During the same 3 years it is expected that military service facilities will have treated more than 1 100 000 hospitalized dependents including approximately 350 000 maternity cases

Working together service and civilian hospitals will have cared for nearly 2 000 000 hospitalized cases—more than one case a minute—since the Medicare program for dependents was authorized 3 years ago by the enactment of P L 569 Babies born under the program total nearly three fourths of a million—one every 2 minutes—about 6 2 percent of the annual total of births in the United State

To achieve optimum utilization of service hospital and to effect economies on 1 October of last year the scope of the program was limited Continuing study by the office for Dependents Medical Care has shown that the range of care available under the program can probably be restored to approximately that which existed prior to 1 October without exceeding available funds The permit system will remain in force to assure that our service hospitals will continue to operate at their optimum level Accordingly at the direction of Dr Frank B Berry Assistant Secretary of Defense (Health and Medical) the uniformed services are now engaged in coordinating procedures designed to effect this restoration It is probable that a final decision on the matter will be forthcoming in the near future

PREVENTIVE MEDICINE

I said before that patient care is our major task but not necessarily our most important task in peace and war Who can say which link of the chain is most vital? Certainly preventive medicine ranks high in importance in maintaining the strength of the Army

Major problems today in military preventive medicine are the continuing difficulties in recruiting and training of preventive medicine officers the increasing hazards arising from the rapidly expanding military use of radioactive materials microwaves other radiation devices and missiles and the adequate training of individuals in small groups in field sanitation and hygiene The latter problem has been

emphasized by the excessive hospital admission rates for diarrheal disease in United States forces in the 1958 Lebanon operation

During the past year however we have made some important advances in the field of military preventive medicine Vaccination against poliomyelitis of all Army personnel under the age of 40 years was made mandatory and a decision was reached to vaccinate all recruits henceforth against adenovirus disease beginning this fall Dried smallpox vaccine will be standardized and it is anticipated that the use of this material will largely obviate our past problems of storing and shipping this delicate material which has been so thermolabile in its usual liquid form Recent developments in the field of medical entomology have produced a highly effective insect repellant (diethyl toluamide) for application to the skin this item is now being standardized It is rather disturbing that many insects of medical importance are rapidly developing worldwide resistance to standard insecticides Thus new and potent insecticides are constantly being sought

In the future practice of military preventive medicine the problem of how the Army Medical Service may best help to evaluate and reduce radiation hazards to our troops from military and nonmilitary sources will become of increasing importance An intensive survey is now under way to determine our capabilities in this field and to establish a base line for further expansion of these capabilities Still another task is to develop more current and accurate technics for reporting disease and better means of disseminating our burgeoning knowledge about infectious disease Training our medical officers in the exotic but classic communicable diseases of military importance such as cholera typhus plague and smallpox poses a peculiarly knotty problem and we believe that we must send our best officers for training to those parts of the world in which these diseases exist

The growing realization of the enormous medical and public health problems that will be shared by the civilian and military populace following major disaster such as nuclear attack is a cause for grave concern Guidelines for the Army's specific role in civil defense have been prescribed and we will continue to explore how the Army Medical Service can best cooperate with and assist the civil defense and civil affairs authorities in helping to relieve an afflicted population

PERSONNEL AND TRAINING

The Army Medical Service as you well know comprises several components and in addition has assigned enlisted men and women These three corps constitute the lifeblood of the Service I am deeply [illegible] of the team concept in medicine I favor the

highest integration of medical disciplines concerned with the health of troops

Perhaps in no other area has the Army Medical Service showed greater improvement in recent years than in the quality albeit not the quantity of its personnel Following their internships more and more of our doctors are being trained in the various specialties We now have almost 600 board-certified Army medical officers on duty and we currently have over 650 doctors in specialty training Fourteen of our hospitals are approved for training various specialists and interns Our nurses are becoming more skilled through service courses and higher education at civilian institutions Many of our allied scientists of the Medical Service Corps are improving their stature and value to the Army Medical Service through graduate training Our administrators of the Medical Service Corps are becoming more skilled in modern methods of hospital administration through their attendance at seminars and courses in hospital administration Our enlisted men and women are becoming even more proficient through training and practice—and they comprise by no means the least part of the medical team whether in or out of a hospital Whenever I say medical team I include not only those I have already mentioned but also our fine dental officers veterinary officers members of the Army Medical Specialists Corps and our faithful and devoted civilians The proficiency of all of our men and women in the care of the sick deeply impressed the current president of the American College of Surgeons Dr Owen Wangensteen during his recent tour of our installations in Europe He said There is a very obvious attitude of interest in the work and a keen awareness of their sense of responsibility such as one is always privileged to observe amongst a group of superior medical men

Medicine is dynamic never static Proud as we are of our past accomplishments and present abilities we must plan for continuous improvement I am certain that the training of our young officers can be improved even further and I propose to exploit to the fullest the vast pool of clinical material and the ever increasing numbers of our certified staff men in many of our larger post hospitals to augment our residency training programs We are utilizing certain of these station hospitals not for additional residency spaces but in strict affiliation with our present adjacent teaching hospitals This I believe will not only raise our training standards even higher than at present but more important will stimulate such interest and present such challenges to all that the care of patients in these post hospitals will be vastly improved Concurrently with this I believe our research efforts can be expanded and more closely integrated with our

clinical work in adjacent hospitals to the mutual benefit of patients clinicians and our research workers We must take the same giant steps in further improving the training and working conditions of the other members of the medical team

Training is not the only solution to our personnel problems We must continually improve the attractiveness of the Army Medical Service so as to increase procurement and retention of officers in all of our Corps I believe that some of the things I have discussed already such as improved facilities improved training improved team work and improved living conditions will contribute to this end but other means must also be found We are working on a number of projects in this area but have not yet reached the stage where we can report specific programs

FIELD MEDICINE

Combat readiness is the primary mission of the Army The capability of rendering adequate support to the Army in the field is our continuing responsibility As you know the concepts of war have undergone and are still undergoing more radical changes in recent years than at any *time since the invention of gunpowder In future conflicts tech*niques will be based on the theoretic use of nuclear weapons whether *they are utilized or not There will be vast increases in range and*— more important from our standpoint—lethality of all weapons nuclear *or conventional* Possible use of *nuclear weapon will increase the* need for tactical and strategic mobility If high yield nuclear weapons are used we will have mass casualties on a scale never before dealt with and never before occurring in such a short time or over such a wide area Our job then will be to support troops in a combat zone vastly extended in both width and depth The tactical dispositions and movement will be highly fluid capable of rapid concentration of widely dispersed units for violent attack and followed by equally rapid dispersion and deep exploitation Our units will probably be smaller complete mobility and means of continual communication for rapid control will be most essential Authority of supply will be of necessity on a scale heretofore not experienced and air evacuation of our casualties the favored method

It is true that the pathology induced by chemical nuclear weapons toxic chemical and intentionally induced diseases with the possible exception of radiation sickness is no different from the pathology with which I have had to deal in the past The prevention and treatment *of inf[illegible] thermal and mechanical trauma and chemical* poisoning indeed are not new to us However the situation in which *we deal with disabilities produced by these weapons as I mentioned*

previously may be vastly different from that in previous conflicts

Strengthening and improving the capability of the Army Medical Service to provide the highest standard of medical care in peace time will strengthen our capability to provide medical troop support during war both in garrison and in the field But that alone is not enough We must develop new doctrine new techniques and new equipment and improve organization and operation for the support of the Army in the field In this area we have not progressed as rapidly as we would have liked General Hays recognized this problem Shortly before I took over he established a Combat Development Command to coordinate the execution review and analysis of our combat development program with that of the Department of the Army Headquarters Continental Army Command and other agencies as appropriate This group should contribute substantially to the improvement of medical combat support effectiveness The new idea for our present combat development group in consonance with that of the Army is to develop the concept for the future—to provide guidance for the development through research of materiel essential to the support of the concept—rather than to accept the best items available

As important as it is to be prepared to fight the war of the distant future it is equally important to be prepared to incorporate doctrine organization and materiel into our current capability of meeting emergencies that may arise in the more immediate future In this connection we are conducting a program for the reconstitution of field hospital assemblies We are not only replacing outdated and outmoded items but are using modern packaging techniques to provide for improved portability mobility air transportability and versatility better to support the current pentomic concept

Most of you are acquainted with the Medical Materiel Program for Nuclear Casualties This is a program developed in cooperation with the Office of the Secretary of Defense and our sister services to preposition emergency medical treatment units with troops for use in case of nuclear attack This program is divided into three phases Phase I is designed to meet the needs for self (buddy) or nonprofessional aid when the workload far exceeds local medical professional capabilities and when utilization of nonskilled personnel for emergency care is mandatory Phase II is intended for professionally directed survival care under the supervision of medical officers Phase III provides full definitive treatment administered by professional and ancillary medical personnel under professional supervision Phases I and II are well underway with some of the units already in place We are now instituting a program for the training of personnel in the use of these units

The Korean War proved the value of using helicopters for the evacuation of the sick and wounded We have 19 helicopter ambulance detachments now Within the next fiscal year this type of unit will be replaced by air ambulance companies which will have 24 helicopters each as opposed to 6 helicopters in our present detachments

In planning for emergencies my staff and I will continue to place emphasis on the preparation development and constant improvement of plans designed to insure the best possible medical support for each combat element in the event of mobilization In this connection we must continue also to carry on a program of close surveillance of the training and preparedness especially of our Table of Organization and Equipment medical Strategic Army Corps and Strategic Army Force units I deem this program particularly important

RESEARCH AND DEVELOPMENT

Medical research must not only continue to contribute to the improvement of the Army Medical Service during peace time but must produce the answers to numerous problems upon whose solution may depend our ability to win future wars and perhaps even to survive Although the responsibility for research in defense against chemical biologic and radiologic (including thermonuclear) warfare belongs to the Army Chemical Corps the fact that these weapons systems act through alteration of physiologic functions means that we in the Medical Service must contribute our knowledge and skill toward developing measures that will protect military personnel against these weapons This requires active and vigorous research aimed at discovering measures to increase man s resistance to radiation protect him against the incapacitating and lethal effects of toxic chemicals and increase his resistance against infectious diseases many of which might be unfamiliar to Medical Service personnel Where preventive measures fail and large numbers of casualties are produced within short periods of time we must develop better therapeutic techniques applicable on a large scale to save lives and return men to duty in minimal time

In many of the areas where military operations might take place the disease hazards are still unknown United States personnel entering some of these areas would be immunologic virgins and readily susceptible to new diseases We had such an experience with hemorrhagic fever in Korea in 1951 If we are to be prepared to support the United States Army adequately in operations it is mandatory that we acquire data on health problems in many areas of the world

and improve our knowledge of the agents reservoirs and vectors of communicable disease

We are partially covering this requirement by maintaining the 406th Medical General Laboratory in Japan by sending research teams to many far-off places at the request of local governments to assist in the control of epidemic disease and by assigning medical service personnel to collaborate with native scientists in their own laboratories We now have a medical parasitologist in a medical research laboratory in the Belgian Congo and are in the process of assigning a medical officer who is a microbiologist to the Thai Army Institute of Pathology These activities not only meet a medical military requirement of ours but assist other nations in their struggle to improve their health services and conquer disease I believe such assistance is of great value in cementing the friendship between our country and other nations of the world

In a broader sense I hope to expand the contributions of the Army Medical Service to the betterment of world health which I believe is to be a major factor in the furtherance of world peace I believe the Army Medical Service can make a major contribution to this end working not only through the established media of military assistance advisory groups but also working reciprocally with all nations You are doubtless aware that many of our experts in medicine and surgery have already been invited to speak and teach in many countries particularly in Taiwan Japan and Korea and in Southeast Asian areas It is hoped that such teaching missions may continue to be sent to these and other countries and that we in turn can meet with and learn from scientific leaders of other nations who could visit us here

I have said that anything that improves our peacetime medical capability improves our combat medical capability The reverse is also true Our research and development program while primarily designed to strengthen our combat capability has contributed and is contributing to the quality of our medical practice in the Army and to the practice of medicine throughout the nation

During the past 2 years from our research program have come better methods for the early diagnosis of infectious disease improved techniques in use of the artificial kidney and the first really effective method of artificial respiration namely the mouth to mouth method

Research is a fundamental responsibility of members of any health service The Army Medical Service is no exception We are proud of the contributions of those who have preceded us and we must continue to make similar contributions to insure that we will never fail the Army in time of need to make our share of contributions to the

advancement of medical science and to maintain our reputation for the highest quality of patient care

CONCLUSIONS

This of course is but a thumbnail sketch of our progress to date and our plans hopes and outlook for the future A plan for the future must be flexible and under continuous review It must be adjusted with the appearance of each new problem and the solution of an old one It must take advantage of every opportunity and be ready to overcome all obstacles Above all it must be receptive to new and better ideas I express my hope that you will let me share your thoughts on how best we can together accomplish the mission of the Army Medical Service I welcome the constructive criticism and assistance of each of you and all members of the Army Medical Service I have long been a great believer in the following observation made by Doctor Karl T Compton of the Massachusetts Institute of Technology I believe that experience logic and human psychology all support the view that the type of government (command) most likely to be successful in the long run is the one that directs and inspires but does not too rigidly control which offers large opportunity for initiative and criticism which has faith in the mass judgment of an intelligent group and in the genius which may appear in unexpected quarters Our pride in the Army Medical Service reflects achievements to date our task is to assure a better service tomorrow May the verdict of history be kind to all of us

WORDS OF A COUNTRY DOCTOR

To tell you gentlemen of the medical profession I would like to tell him that I must shock the public by telling them as a matter of fact my graduating class The country doctor has to be the Jack of all trades in medicine He must be a diagnostician a surgeon a pediatrician a psychiatrist a dentist a veterinarian a midwife and a good mixer Also I would suggest to the young graduate of today that he will find the old methods of doctoring will still be found useful in the days to come although the public demands the use of the latest methods of treatment The country doctor has to be the first to adopt them

From the Saturday Evening Post—Issue of January 5 1929

Case Reports

Endometriosis of an Episiotomy Scar

CAPTAIN R. RICHARD MURRAY, USAF (MC)

SINCE 19[illegible] when Sampson began [illegible] upon the histogenesis of endometriosis reports [illegible] helpful in the medical literature. One of the less common [illegible] external endometriosis is a perineal scar [illegible]. In a review of the literature in 1[illegible] Cutherwood and Cullen found reported cases of endometriosis of perineal scars [illegible] 14th case. In each of the next [illegible] more such cases were reported.[3-5] From 1[illegible] to 1[illegible] new cases were recorded in the English literature,[6-8] including a series of 4 cases by Hartman,[6] [illegible] mentioned briefly in conferences and lectures. Of the [illegible] reported cases of endometriosis in an episiotomy scar reviewed, 6 cases were associated with a previous and [illegible] typical [illegible] vulvar resection. 4 cases[7] had a recurrence of aberrant endometrial tissue following surgical excision and only 1 case was associated with definite evidence of endometriosis elsewhere in the pelvis.

An additional case of endometriosis in an episiotomy scar follows.

CASE REPORT

The patient was a 23 [illegible] white married [illegible] woman in para [illegible] gravida [illegible] abortus 0. Menses began at age 13, were [illegible] attired, [illegible] 5 days every [illegible] and [illegible] regular. The patient had an [illegible] uncomplicated pregnancy terminating [illegible] in spontaneous delivery [illegible] July 19[illegible]. Over a right mediolateral episiotomy. Her [illegible] and delivery was [illegible] July 19[illegible]. [illegible] one week right mediolateral episiotomy. A [illegible] at [illegible] revealed [illegible] and [illegible] post-partum bleeding occurred during the delivery [illegible] but it was [illegible] adequate transfusion [illegible] supportive therapy. Healing was prompt [illegible] adequate after each episiotomy. The patient had [illegible] difficulty until about [illegible] months post-partum at which time during [illegible] menstrual period [illegible] noted a slight swelling to the right of the anus. This swelling recurred and increased in size with

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From the USAF Hospital, [illegible], San Francisco, Calif. Dr. Murray is now at the Brooklyn Methodist Hospital, Brooklyn, N.Y.

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CASE REPORTS—ENDOMETRIOSIS IN EPISIOTOMY SCAR

The patient [illegible] complaints and [illegible] deliveries



Figure [illegible] photomicrograph of a section of perineal tissue showing [illegible] endometrial glands and stroma [illegible] (H&E)

Fourteen n nths aft h l t pregnancy the p t t was ami ed whil under gere al nesthes The vagina uteru a d dnexa w normal I a r ht edi l t l ɟ i i t y sc a sl htly a sed bl i h l l ulat d fi m cy tic m bout 10 1 in diam ter a n ted (fig 1) Thi n a s w s m ed in toto in an llipt cal exci i l b opsy d th e lti tiss e defect cl sed w th catgut

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DISCUSSION

Fndometriosis of an episiotomy scar is an isolated example of a broad and interesting disease entity the histogenesis of which is a favorite topic for discussion The current theories for this histogenesis singly or in combination fail to explain all cases of this disease Recently economic status and the modern pace of living have been suggested as predisposing etiologic factors with the implication of a future increased incidence of the disease

Fndometriosis in an episiotomy scar is most easily explained on the basis of implantation of endometrial fragments sloughed off at the time of delivery It has been shown both that endometrial tissue transplanted to other parts of the body will grow and that there are viable endometrial fragments passed at the time of menstruation Considering the high percentage of episiotomies performed during vaginal deliveries thus affording excellent opportunity for transplantation and growth of endometrial tissue fragments it is difficult to explain why the incidence of such cases is so rare Novak Meyer and Carberry found a significantly lower incidence of endometriosis in abdominal scars following cesarean sections than in scars resulting from other uterine surgery Thus the presence of a pregnancy seems to be an inhibitive factor in endometrial tissue implantation Several possible explanations of this inhibition may be mentioned Kimball and Reeves suggested one difference in growth potential of the endometrium in the pregnant and nonpregnant uterus There is always the question of hormone influence

which either renders the implantation site unsatisfactory for growth of endometrial tissue or which makes the endometrial fragments non viable The endometrial fragments which are presumably sloughed at the time of delivery may not be viable simply because of the increased pressure exerted upon the endometrium by the fetus membranes and amniotic fluid The amniotic fluid may be the inhibitive factor Any endometrial fragments present during a delivery may be washed away by the fluid, or the amniotic fluid may have some toxic factor preventing the implantation or growth of the tissue

SUMMARY

Twenty six cases of endometriosis of an episiotomy scar have been reported previously in the English literature and an additional case is presented Although the histogenesis of endometriosis is not known cases of this disease occurring in an episiotomy scar may be easily explained by transplantation of endometrial fragments sloughed at the time of delivery The low incidence of such cases, however raises many questions This article poses several possible explanations for the low incidence of endometriosis occurring in an episiotomy scar

ACKNOWLEDGMENT The author wishes to thank Major John F Crawford chief of obstetrics and gynecology Captain Richard P Hudson Jr and Lieutenant Gottlieb of the histopathology department and the medical photographic laboratory staff for their assistance and cooperation in the preparation of this article

REFERENCES

1 Sampson J A Perforating hemorrhagic (chocolate) cysts of the ovary their importance especially as regards pelvic adenomas of the endometrial type *Arch Surg* 30 94 Sept 1925 Cited in Te Linde R W *Operative Gynecology* 2d edition J B Lippincott Co Philadelphia 1954 pp 499–501

2 Allocated Knife Endometriosis *Gynecology Obstetrics* 3d edition W B Saunders Co 1954 pp 488–491

Catherwood A F and Colle F S Intramuscular reaction in episiotomy wound *Am J Obst & Gyn* 69 1364–1366 Dec 1954

3 Kistner R W and Youngs F A Intramuscular implantation of vaginal epithelium *J Obst & Gyn* 63 424–428 Feb 1952

4 Colliard W S Case of endometrioma apparently implanted by mechanical trauma *Am J Obst & Gynec* 66 191–193 July 1953

5 Duson C K and Zelenik J S Vulvar endometriosis apparently produced by menstrual blood *Obst & Gynec* 3 6–9 Jan 1954

6 Nussbaum W and Mottlow I Endometriosis of the vulva during pregnancy *Am J Obst & Gynec* 3 15–16 Jan 1957

7 Prince L N and Abram J Endometriosis of the perineum review of literature and report of case *J Obst & Gynec* 3 890–893 Apr 1957

8 Henrik en F E d metr is *A J S g* 90 331–337 Aug 19
9 Weed J C E dometri sis n N g 4n S g 141 61ɔ–6 0 May 19
10 Ri t r J H a d Ed ard I K Fxpe im t l end tri i in tl h m *Am J Obst & Gy* 6 83 ɔ0 O t 19 8
11 Te Li R W and Scott R B E p imental e lomet i is 4 *J Obst & Gyne* 60 114 11 3 Nov 19ɔ0
1 Scot R B T L nd R W a d Wh art L R J Γ ther sti l es on expe ime tal e d met i 4 *J Obst & Gy cc* 66 10 –1103 N v 19ɔ3
13 Nora E Sr Meyer K A a d C rb rera P Fet p e l met i m in ab d mi al foll i g caesa an ecti 1 *J Ob t & Gy icc* 1 8 6–884 Ap 1 6
14 K all L O a d R eves W E d met lti g f m t pl t f dom t n at tim f a l nt l pe f at a f ut u l g u ettage *Am J Obst & Gy c* 3 4 –4.8 F b 19 7

Stevens Johnson Syndrome Following Sulfamethoxypyridazine (Kynex) Treated Successfully with Triamcinolone

HOWARD S YAFFEE M D

RECENTLY there has been much interest in the infectious etiology of the syndrome first described by Stevens and Johnson consisting of erythema multiforme with fever and mucosal lesions Advances in microbiology indicate that many hitherto unexplained disorders are associated with viruses and of late the role of herpes simplex in the Stevens Johnson syndrome has received renewed attention In all probability this symptom complex like many others in clinical medicine is a tissue reaction which may be evoked by a number of agents The commonest and perhaps best understood of these are drugs Reports of the Steven Johnson syndrome attributed to sulfonamides to penicillin (both of which are also mentioned in earlier reports as having therapeutic efficacy in this disorder) to salicylates tridione and phenobarbital may be found in the literature Recently the syndrome has been described following chlorpropamide therapy and the author has also encountered In the following case the syndrome is believed to have been caused by a newer sulfonamide sulfamethoxypyridazine (Kynex)

F B thI IHospit l t M s

CASE REPORT

A 46-year-old white woman was admitted to the neurosurgical service of this hospital with progressive weakness of her right arm and leg. Physical examination disclosed a blood pressure of 170/80 mm Hg, pulse rate 60 per minute and respiration 20 per minute. Right hemiparesis was present. There were signs of early hypertensive cardiovascular disease with slight left ventricular enlargement and grade I retinopathy. The patient was otherwise alert and *rational. Electroencephalographic study and radioactive arsenic scan* confirmed a suspected lesion in the left frontal area. Upon operation a huge glioblastoma multiforme was encountered but because of its size and invasiveness the prognosis was poor despite extirpation of the lesion at operation.

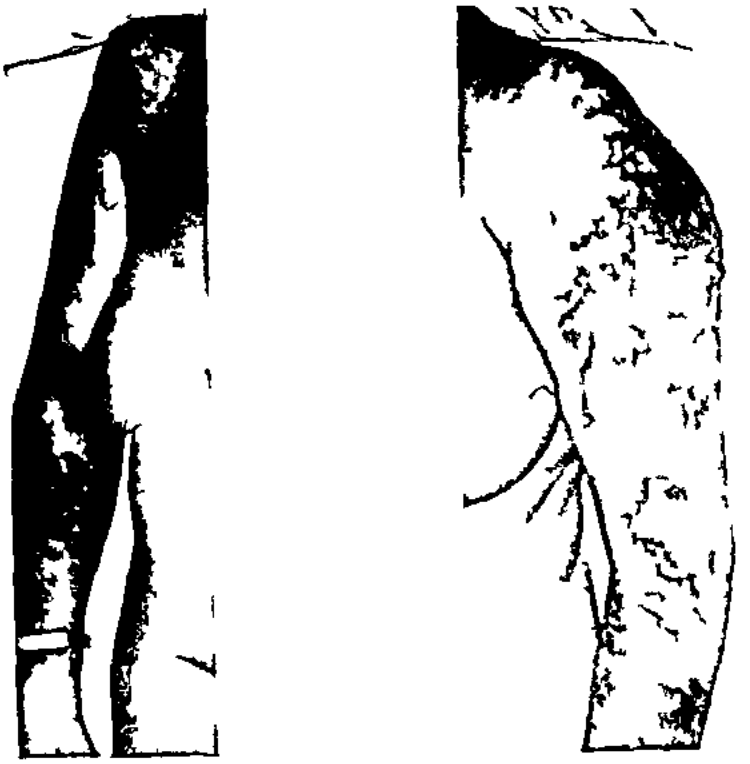


Figure 1. Bilateral [illegible] eruption of trunk and upper extremities.

Intravenous fluids, thiamine and penicillin were instituted in the urinary bladder. The patient received sulfisoxazole prophylactically. Aspirin daily for five days and daily for a half day. Nine days later a mild erythematous eruption was first noted over the arms, trunk and later the face. It quickly progressed to a generalized urticarial bullous and purpuric rash within the ensuing 24 hours period. All medications were discontinued and therapy with antihistamine was begun. Despite these measures the eruption continued unabated and soon was generalized.

Examination revealed (Fig. 1) hundreds of hemorrhagic bullae, purpuric macules and bullae varying in size from that of a pea to central bullae measuring five inches in diameter. All were tense and

small erythematous macular papular and plaque like lesions of the trunk extremities palms soles and face Mucosal lesions were present and were of peculiar interest The lesions were severely eroded The entire epithelium and basement membrane were ulcerated and crusted leaving intact erythematous borders and in the buccal and nasopharyngeal mucosa The gingival and palatal mucous surfaces were similarly affected The conjunctivae were diffusely injected but no specific lesions were noted Vesicles were not noted In contrast to observations made by the author in similar cases the temperature was above 101 F only for 48 hours despite the severe cutaneous lesions

Administration of 16 mg of triamcinolone was initiated by the house staff for the relief of pain with little effect the dosage was increased to 60 mg daily in divided dosage After 36 hours on this level were noted Therapy was discontinued abruptly thereafter with the exception of a single dose of 40 mg given 72 hours after the initial dose This dosage was gradually tapered to 8 mg daily over a period of 10 days with no recurrence of the lesions

Despite the severity of the cutaneous lesions the laboratory findings were normal The peripheral blood count urinalysis and blood chemistry revealed no evidence of the systemic toxicity sometimes seen following adverse reactions from this drug These include hepatitis hemopoietic abnormalities especially leukopenia and hemolytic anemia and gastrointestinal central nervous system and cutaneous reactions

It is extremely important to suspect a drug reaction in any patient exhibiting an erythematous urticarial or purpuric eruption All medications and ingestants should be withdrawn immediately and later if desired—depending upon the exigencies of the situation and the severity of the reaction—reintroduced independently Unless reintroduction is performed with great care a severe reaction may be precipitated The order of reintroduction should be in inverse relationship to the probability of causation—most unlikely drug given first most likely drug last The failure to recognize and withdraw a offending agent may result in severe and prolonged vasculitis with fatalities

The treatment of the cutaneous lesions is dependent upon the symptoms In the above case bullae were treated with maceration, wet dressings and debridement followed by gentian violet The role of appropriate topical therapy is sometimes overlooked during a prolonged hospital stay, but resolution of the lesions may be facilitated by proper management The steroids as antiphlogistic agents have resulted in great improvement in the morbidity and mortality of this hitherto dangerous clinical syndrome Despite their great popularity they are still best utilized by those familiar with their idiosyncrasies In the case under discussion, in which postoperative cerebral edema and electrolyte imbalance were feared complication triamcinolone was ideal in that its salutetic properties did not tax an already hypertensive cardiovascular circulation and swollen brain

One must not be misled by labels If—as we have implied—diseases are tissue reactions to various stimuli the physician ought not be comforted by the presence of an old friend the diagnostic label The term Stevens Johnson syndrome—or for that matter, erythema multiforme—demands a search for the etiologic factors upon which effective treatment depends Thus a purpuric erythema multiforme with or without mucosal lesions caused by the meningococcus or streptococcus is best handled with specific antibiotic whereas drug reactions may be aggravated during vigorous treatment of a mythical infection with the very medication which unsuspected is the cause of the eruption

SUMMARY

A 46 year old Negress already received sulfamethoxypyridazine prophylactically for urinary retention following brain surgery for a glioblastoma multiforme Nine days later she developed an acute Stevens Johnson syndrome with cutaneous and mucosal lesions associated with brief low grade fever The patient responded to 60 mg of triamcinolone daily over a 2 week period

A plea is made for proper etiologic evaluation of all cases of erythema multiforme with and without mucosal lesions

ACKNOWLEDGMENT The author wishes to express his appreciation to Dr Albert Starr in whose service the patient was admitted

REFERENCES

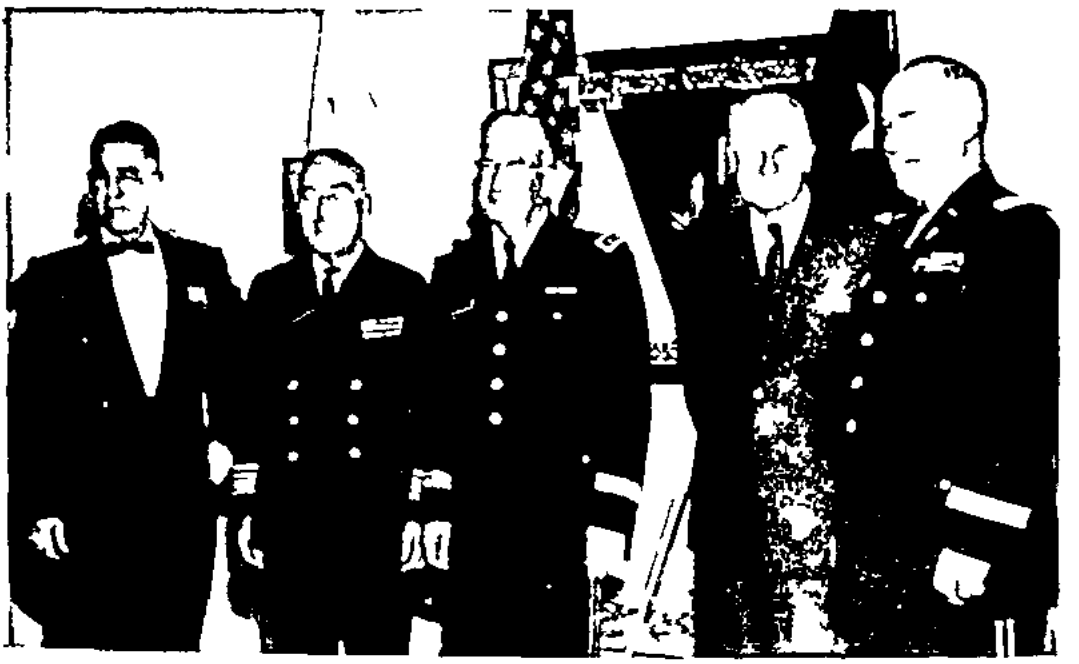
1 Stevens A M and Johnson F C New eruptive fever associated with stomatitis and ophthalmia Am J Dis Child 47 526 543 Dec 1934

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4 ST A R C PIA F U HY H III an l Hter I D Chl rp pa mide th apy f d al tes a apl al *Neic F jl l J Med* 61 4 –430 Au ~ 19 9
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6 TI ALE W A F al h pat tl f l kin ra l f ll l g th py with lfa tho p la a l t g ulf a il \ *F jl l J Med* S 687–690 Ap 19 8
PER Y H O a d WI KELM R K A l e e r a ti s to ulfam th xy pyrida (k x) t t in th t eat t f l matiti h petifo mi *J A M* 4 169 1 –13 J 10 19 9

MEDICAL SKILL AND PATIENT MORALE

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Military Medical News



MILITARY MEDICAL LEADERS During an October meeting of the Department of Defense Civilian Health and Medical Advisory Council the surgeons general of the military departments and Dr Frank B Berry Assistant Secretary of Defense (Health and Medical) made an official visit to Fitzsimons Army Hospital in Denver and the U S Air Force Academy Colorado Springs Shown at a Fitzsimons reception in their honor are left to right Major General Oliver K Nelson Air Force Surgeon General Rear Admiral Bartholomew W Hogan Navy Surgeon General Lieutenant General Leonard D Heaton Army Surgeon General Dr Berry and Major General John F Bohlender Fitzsimons Army Hospital commander

CUSHING HEADS GROUP AT PAKISTAN MEETING

Dr Edward H Cushing Deputy Assistant Secretary of Defense (Health and Medical) and members of the Interdepartmental Committee on Nutrition for National Defense were among United States representatives to the third annual conference of the Armed Forces Information Committee on Nutrition in Rawalpindi Pakistan on 19 24 October Other countries represented at the meeting included Iran Turkey the United Kingdom and the Philippines

The Interagency Committee on Nutrition formed as a result of the visit created by U S nutrition survey teams in Iran and Pakistan will hold its fourth conference in Washington D C August 1960 Prior meetings have been in Iran and Turkey

The Interdepartmental Committee on Nutrition for National Defense organized in 1954 under the chairmanship of Dr Frank B Berry Assistant Secretary of Defense (Health

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ZIPORIN GIVEN GRANT

Dr Zigmund Z Ziporin chief of the biochemi tr ection U S Army Medical Re earch and Nutrition Laboratory located at Fitz imon Army Ho pital Denver Colorado has been awarded the Secretary of th Army Research and Study Fellow hip to continue hi research on the body u e of vitamin D at the Karolin ka Institute in Stockholm S eden After completing hi work at the Institute h will visit the Univer ity of Oslo Nor a Cambridge Univer ity in England Sorbonne Univer ity in Franc and the Tubingen Univer ity in Germany



The Army program which was tarted in Augu t 1956 offer career civilian employee of the Department of the Army an opportunity for recognition and profe ional development and authorize up to 12 month of advanced tudy or re earch for fellow hip recipient in their pecial field

ANTARCTIC VOLUNTEERS

The Surgeon General of the Navy ha called for regular and xpand re erve Medical Corp offi er volunteer to man the Antarctic Sta ion Hallet Byrd and McMurdo Sound Ba e for Operation Deep Freeze 61 Volunteer will be ga ed to 8 month of medical and dental tour during the period April 1960 and will fly to Antarctica Hallet Station to Fiji and New Zealand until full jet duty approval ha been obtained at a later date Officer who wi h to volunteer hould notify the Bureau of Medicine and Surgery by letter tating Code 31

OFFICIAL DECORATIONS

The following award were recently announced by the Department of the Army and Air Force

Legion of Merit

Edward H McGuire Col USAF DC

Army Commendation Ribbon with Metallic Pendant

Nick Klimutter Lt Col MC USA

Fortunato Sfalcin Major

WARFARE DEFENSE COURSE

A five week course in ABC Warfare Defense for experienced medical officers on active duty in the military service will be given 4 January 1960 at the U S Naval School Command Treasure Island San Francisco California The course will treat medical aspects of modern warfare and military peacetime operation including atomic biological and chemical warfare nuclear propulsion nuclear facilities and isotope programs as well as military aspect of weapons system and military communication Lecture will be given by civilian and military speaker

CELL GIVEN NEW AWARD POST

Captain Charle J Cell MC USN pecial a i tant for medical affair ha been elected Chief of Naval Per onnel by the Secretary of the Navy to fill the newly created billet of Director Navy Medical Department Research and Development Board The election of a director by a committee on electronic will be based on technical qualification for the po t and experience in the Navy Medical Department Research and Development Board The director will be charged with the responsibility for the coordination of all medical research and development activities within the Department of the Navy

Progress Notes

B g d Gene l **Loyd E G ff** USAF MC who t d as u g on of th Str t g c At C mm d Offutt Ai Fo ce B N brask on 31 August aft r 9 y rs of act e ce h been u d d by B g d r Ge l **Theod E B lw ll J** USAF MC f m deputy u geo Capta **John S C ugg l** MC USN U S N l Propella t Pla t I d Head M l nd ha b en el t d as a fellow f th A ne i an C ll g of Pre entt M d e C l l C l **J Strub** USAF MC s th w m ma d f th USAF H p tal M the A r F B c C l f iceeed g L t t Colon l **Ol C Hood** USAF MC wh h b nt f d t F Colo el **R y F R l t** MC USA ha as m d mma d f the U S A my H p t l Fo t Le Virg pl c g C l l **G o g H f ll** who ha t d Colon l Robe t wa h f f m d l c t F t S ll Oklah m

C l l **Ph l p A B gm n** MC USA h f f th p f l d i g l es t U S A m Ho p tal Fo t J k So th C l h s a n d h w d it h d f g r t F t mo A m Ho j tal D C l r l e ed g Colo l **J hn M S ly** MC USA who re t d J l C l l **Tl oma W H w ll** USAF MC h f f l cal d e USAF H p t l Off tt A r F B N b a k c e l d C pt **Cl l B Ca ty** USAF MC a mma d f th 83 th T ett l A C mm d H p t l Sl A F r Ba So th C l h C jt C t l ft f d d m d l t g

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C pt N m n **L B** MC USN Na y p l tma t on and p m d e ch et d l S p- t mb ft n l e eer f l rs D ctor of th t auti l d n f th B e f M d c e a d S g t l h tly bef h t m t h was a so t d w th m mpl h m t of th N y med c l h p g m d is th l kn n ffi r n the m l t se s who i t tl d t w fi p t m l ta y t n w g cl d g th of Na l t r d A F p l t Co g l s pp d t f f A my nd N G l H p t l Hot Sp g to th Stat f Ark sas to b u d f r h lth t l habil t t r d t al p po

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C l n l **R H Rl** l DC USA (R t) po f th A my D t l C p a d f m h f f th d t l d io ff f the Ar y g g r l d d 11 Sept nl r t W lt R d A y H p t l g l 83

I t t R l t W F MC USN ha p t d f lut a d lo- g t t tl US N l Ho p t l New p t Rh d I l d f m th US N l Hosp t l Ph l d lph a

M j H n y K S ll n n MC USA a t t h f f th p y h t c W lt R d A my H p t l has b d d t fi t f

achievement for his work with the 75th Station Hospital Stuttgart Germany

Captain Haskell M Wertlieimer MC USN recently reported as chief of surgery at the U S Naval Hospital Newport Rhode Island from the U S Naval Hospital Yokosuka Japan

Lieutenant Colonel Edward S Bates MC USA has succeeded Colonel Irving R Lyman MC USA as chief of professional services U S Army Hospital Fort Lee Virginia following the latter's assignment to the 98th General Hospital in Neubrucke Germany Colonel Karl F Ehlert DC USA also assigned recently to the 98th General Hospital in Neubrucke has been replaced in the office of the Army surgeon general dental division by Lieutenant Colonel James M Fnme DC USA deputy dental surgeon Sixth U S Army Presidio of San Francisco California Colonel John F Boyen USAF MC director of professional services Headquarters USAFE Wiesbaden Germany has been assigned as deputy surgeon Headquarters Air Material Command Wright Patterson Air Force Base Ohio

Colonel John J Pilot MC USA former commanding officer U S Army Hospital Fort Hood Texas has assumed command of the 68th Medical Group Fort Meade Maryland

Rear Admiral Cecil Anlow MC USN commanding officer U S Naval Hospital St Albans New York was promoted to his present rank on September Forthwith before reporting as assistant chief for personnel and professional operations Bureau of Medicine and Surgery Washington D C

Lieutenant Colonel Robert B Franklin MC USA commander of the 5th Surgical Hospital Heidelberg Germany recently assumed duties as chief of general medicine at Fitzsimons Army Hospital replacing Major Willard H Hall MC USA who left Japan for advanced medical training at Brooke Army Medical Center

Brigadier General Francis W Pruitt MC USA (Ret) chief of Walter Reed Army Hospital's department of medicine until his retirement 31 August has been named coordinator of graduate education at Hillcrest Medical Center Tulsa Oklahoma

Captain Horace I Joy Jr MC USN U S Naval Hospital Chelsea Massachusetts has been elected to fellowship in the American College of Chest Physicians and in the American College of Cardiology *Dr Roland* B Mitchell chief of the medical sciences division U S Air Force School of Aviation Medicine recently was given a sustained superior performance award the second highest rating which can be earned by a federal employee Rear Admiral Bartholomew W Hogan MC USN Surgeon General of the Navy was elected an honorary fellow of the International College of Surgeons at the 24th annual meeting of the North American Federation of the organization in Chicago

Captain Merrill H Cooley MC USN has been appointed assistant chief for Aviation Medicine Bureau of Medicine and Surgery following the retirement of Capt Owen W Cleveland MC USN on 30 September 1959 Lt Col Colonel Amye AMSC USA recently promoted to present rank to headquarters Marine Corps Washington D C where he will serve as chief of Occupational Therapy Section Physical Medicine Division Office of the Assistant Chief of Staff Personnel Headquarters Marine Corps Washington D C Lt Col Flaherty USMC first flight nurse to participate in evacuating wounded military personnel dur

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ACCREDITFD HOSPITALS

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JCAP MEETING

The annual business meeting of the Joint Committee on Aviation Pathology was held at the Armed Forces Institute of Pathology on 6 November under the chairmanship of Captain Carl E Wilbur MC USN Civilian members in attendance were Group Captain J R Jackson and Wing Commander D O Coon RCAF and Desmond Manner M D Wing Commander J K Mason and Group Captain J S Howitt RAF represented the United Kingdom

SAC NEW DENTAL SURGEON

Colonel George N Schulte USAF DC director of dental services at the Gunter Branch of the U S Air Force School of Aviation Medicine Gunter Air Force Base Alabama was recently named a command dental surgeon of the Strategic Air Command Offutt Air Force Base Nebraska He is a 1940 graduate of the University of Minnesota School of Dentistry

DEATHS

NICKELL RAYMOND OLIVER Captain DC USN of St Louis Missouri assigned to U S Naval Hospital Philadelphia Pennsylvania appointed ensign in the United States Naval Reserve 29 May 1942 resigned commission to report to ordered to active duty 11 May 1943 graduated in 1944 from the St Louis University School of Dentistry appointed a lieutenant (jg) in the United States Naval Reserve 21 September 1944 reported for active duty 9 October 1944 commissioned a lieutenant (jg) in the United States Navy 23 August 1945 died 6 October 1949 aged 33 at the U S Naval Hospital Philadelphia of pseudomonas septicemia

ROBERT H TRENTON KIEFFER Captain MSC USN of Elkton Virginia assigned to Naval Medical Research Unit No 3 Cairo Egypt graduated in 1931 from Bridgewater College Bridgewater Virginia received the degree of doctor of philosophy in 1933 from the University of Virginia Charlottesville appointed a lieutenant (jg) in the United States Naval Reserve in May 1941 reported for active duty in July 1941 commissioned a lieutenant commander in the United States Navy August 1945 died 27 September 1949 aged 48 in Cairo of coronary occlusion

LITTLEDALE JOHN RICHARD Captain, AFRS MC of Greenwich New York assigned to USAF Hospital Andrews Air Force Base Maryland with temporary duty at the USAF School of Aviation Medicine Brooks Air Force Base Texas graduated in 1938 from the University of Rochester School of Medicine Rochester New York appointed a second lieutenant in the Air Force Reserve 12 June 1942 reported for active duty 7 September 1942 released from active duty 17 June 1946 appointed a first lieutenant in the Air Force Reserve 4 June 1948 reported for active duty 4 July 1949 died 5 August 1949 aged 37 near Flemingsburg Texas as a result of an automobile accident

VINCENT JAMES HARRY Major MSC USAR of Biloxi Mississippi assigned to U S Army Hospital Camp Leroy Johnson New Orleans Louisiana served on active status from 3 September 1934 to 3 February 1943 appointed a second lieutenant in the Army of the United States 24 February 1943 released from active duty 16 December 1946 recalled to active duty 9 September 1950 died 11 September 1949 aged 41 at Singing River Hospital Pascagoula, Mississippi of myocardial infarction

This Is Your AMA

THE TEXT of the pledge adopted at the 1980 convention is important. The military physician has the privilege of exercising independent professional judgment on behalf of the patient. This pledge was developed by the Committee on Military Affairs and Mobilization and approved by the American Medical Association.

When the Hippocratic oath was written, the ecology of medicine was simple. Today, complex factors affect the physician-patient relationship. Economics, technology, and government regulations have all had an impact on the practice of medicine. The Hippocratic oath, although a noble statement, is not adequate to guide physicians in today's complex environment.

But old traditions and high principles must not prevent us from meeting the challenges of the present. Our profession has a long tradition of self-regulation. Organized medicine has been in the forefront of efforts to maintain high standards of medical care. The AMA's Principles of Medical Ethics, which were first adopted in 1847, have been revised many times to keep pace with changing times.

Right to Refuse Participation. No physician should be forced to participate in any procedure that violates his or her conscience. Physicians have the right to refuse participation in abortions, euthanasia, and other procedures that they believe are morally wrong. This right must be protected by law and by professional organizations.

Relationship with Patients. The relationship between physician and patient is the cornerstone of medical practice. Physicians must maintain the confidentiality of patient information. They must not exploit patients for financial gain. They must provide care to patients regardless of their ability to pay.

Responsibility to Society. Physicians have responsibilities to society as well as to individual patients. They must participate in efforts to improve the health of the community. They must report child abuse and other crimes when they are required by law to do so.

Professional Competence. Physicians must maintain their professional competence through continuing education. They must not practice beyond the limits of their competence. They must refer patients to specialists when appropriate.

Relationships with Other Physicians. Physicians must treat other physicians with respect. They must not criticize other physicians unfairly. They must cooperate with other physicians in the best interests of patients.

Improving Medical Care. Physicians have an obligation to improve the quality of medical care. They must participate in quality assurance programs. They must report incompetent or unethical physicians to the appropriate authorities.

Advertising and Solicitation. Physicians must not engage in false or misleading advertising. They must not solicit patients in a manner that is unethical. They must not pay or accept payment for referrals.

Fees and Billing. Physicians must charge reasonable fees for their services. They must not charge excessive fees. They must not bill patients for services that were not rendered.

Research. Physicians must conduct research in accordance with ethical principles. They must obtain informed consent from research subjects. They must not conduct research that is unnecessarily dangerous.

Teaching. Physicians have an obligation to teach medical students and residents. They must not exploit students for financial gain. They must provide students with adequate supervision.

Conclusion. The practice of medicine is a privilege, not a right. Physicians must earn the trust of their patients and the public. They must maintain high standards of professional conduct. They must be willing to discipline themselves when they fall short of these standards.

From the Council on Legislation of the American Medical Association. The views expressed are those of the author and do not necessarily represent those of the Department of Defense—*Editor*

and related facilities for older people (5) amplification of medical and socioeconomic research in the problems of aging and (6) leadership and cooperation in community activities for senior citizens

This program will not be a success unless the retiree is aided in dismissing some of the *myths of aging from his mind* A *military physician can be an integral* part in stimulating a realistic attitude toward aging by providing the necessary background to answer these widespread myths

1 *Age is normally considered an indicator of disease* As one specialist in geriatrics has pointed out The important point concealed here is the almost complete independence of health from disease as long as one is able to conduct himself by his own efforts physically economically and socially he is apt to consider himself healthy regardless of his diabetes or his arthritis or heart condition Recent research has shown the majority of aged persons to be without functional disability

2 *Age is equated with sickness* This is due in part to a failure on our part *to differentiate disease from the aging process This is another instance of the* negative tendency to perceive impairment but not integrity disability but not ability

3 *There is a magic dividing line* determining old age that is that physical physiologic and social functioning follow the same set course or stages of decline for everyone But there is no single crucial age period during which the general adaptation to the process of aging is likely to occur in the personality structure of an individual When adaptations do show up even within the same group they do so in highly contrasting ways Whether at work or in retirement each person has a different pattern of life

For retirement to be successful these myths on health and aging must be answered *Of great importance for the military physician will be a program* to bring these answers originating to the attention of all service personnel It is the purpose of the American Medical Association program to bring life to years in retirement but for the retirement to be that of improvement the individual must recognize the courses open to him The time to start this recognition is now

TOO MUCH AND TOO MANY

Medical literature today is in a dismal state In 1957 more than 200 000 medical articles appeared in over 4 000 medical journals In that year 659 journals of medical interest were published in the United States alone according to the compilation of the World Medical Periodical by the World Medical Association Specialization *no longer offers any refuge from this inundation of words* Even my own field of major interest the cardiovascular system 60 pertinent journals were being published in 1957 1 of them in English It is manifestly impossible for anyone— physician student pedant researcher worker —*to have more than a superficial acquaintance* with current publications We have too many journals most journals have too many articles and most articles have far too many words —I DON'T KNOW TOO MANY WORDS A Plea for the Medical Reader *Mississippi Valley Medical Journal* September 1959

Book Reviews

T Symptom Complex Schizophrenia ed by Lt Col A *eth* *L A t* MC USA ith f c t ib t 33 i g G St atton I c N w Y k N Y 19 9 I $

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outline of the subject There is a brief glo ary of Japane e terms related to childbirth note on bibliography and an index The format paper and typograph are excellent and the book has an attractive and well d igned jacket The reviewer commend thi ork a good reading not only for member of the medical and allied profe ion but for anyone intere ted in Japan or the Orient

CAPT LOUIS H RODDI MC USN (RET)

COLOR ATLA OF MORPHOLOGIC HEMATOLOGY With a Guide to Clinical Interpretation by *Geneva A Dilmal* BS Edited by *Th I Hal Ham* MD 2 l ge illu trated by *Ett Piotti* 16 col r plates Harvard Univer ity Pre Cambridge Ma 1 9 Price $6

Thi i a l l that Harvard Univer it Pre ought to be a hamed of The e ond editi n n w it hand i) jectionable a the *fir t edition* I refer entirely to the partici ati n of the publi her and printer and not at all to the w rk f the three ut tanding people who prepared th book Genev a Dilland me f the w rld le t hemat l gy tech n l gi t and a fir t rate teacher Th mas Hale Ham editor educat r and scienti t and finally Ett a Piotti an arti t ho w a pr fe ion lly America le t delineat r of blo d cell Thi look i an attri ute the ixteen color plates which illu trate it and it rea on for being I have seen Mi Piotti original drawing and I have een the plate which illu trate the fir t and e ond editions of thi bo k The drawings are beautiful The reproductions—even a I look at them it i difficult to believe that such poor photoengraving exi t much le offered for ale To begin *with the* green i of such a ersene that all subtlety of col ration i inevitably l t All *of the* plate are out of regi ter on e of them a much a a milli meter red image protrudes from the right ide of the blood cell a blue i age protrudes from the left ide to give them the fractured look of a poorly printed Sunday comic heet Where the regi ter i not so drastically di located the cells merely ee out f focu r e one th feeling that his e e are not converging properly The condition of some of the pictures i t est the plates are worn so that the mooth urfaces of the red cell are bl t hed o treaked and the mar in f the ell are lited by a dirty cru t of ink

LT COL WILLI M H CROS Y MC USA

HEY GROVES SYNOPSIS OF SURGERY edited by *Sir Ce l Wakely* Bt KBE CB LLD M Ch D S FRSC FRSE FACS FRACS 11th edition 6 0 pages illu trated Will am Wilkin C Baltimo Md 1958 Price $8 0

De pite the great stride nd advancement made in urgery since the fir t editi n in 1908 ar particularly in the la t fur y r e the f urteenth diti th elit r h a ll di rib ly in et ne th ir iz f *the v lume in th pre nt* d ion In it ri inal co po ition thi b k wa intended a a ready and on ment referen e for the bu y practitioner the tud t and th pr ctitioner ex mini With the pre ent v lum in ff rt ha been made to pr ide the e l ree f fa tual inf rma ti n in the *broad* le f pr ct ce Th ir t ch pter l k t top d ver a fac lit t at n meri e The pecial arrangement f ll d type and indented ma gin t ether with 190 illu trative figure 113 in t ext pl tes n rface urface enables the reader in the w rd f the original author to ee the cope of the ubject at a glance and to refer t any part f it t will The ntent f the pre ent editi n incorporate the

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R s t

THE CHILD WITH A HANDICAP A Team Approach to His Care and Guidance edited by *Edgar F. Hartner* M.D. with 27 contributors 408 pages illustrated. Charles C. Thomas Publisher Springfield Ill. 1959. Price $11.

In reviewing this book the pediatrician cannot help recalling the familiar face of the editor who for many years in an executive capacity annually viewed the large audiences of the American Academy of Pediatrics from the platform. We now know with what he was preoccupied. From this vantage point he has been able to bring together in one volume experts in the many fields of medicine psychology education and social work as well as the parent all with the goal of assuring the child with a handicap the opportunity of reaching his highest *potential* in all spheres of his growth and development. These 27 contributors regardless of their professional designation and attainment are ever mindful of the multidisciplined approach as the most successful one in dealing with these many facet problems. All persons be they professional or lay groups interested in helping the millions of handicapped children in our nation to gain their objective will find this volume interesting and helpful in reaching a greater understanding of the care and management of the handicapped child through the team approach.

COL. OLDEN C. BRUTTO MC USA

PHYSIOTHERAPY IN OBSTETRICS AND GYNECOLOGY (Including Education in Childbirth) by *Helen Heaney* revised by *Mary Fish* MCSP. Second edition 244 pages illustrated. William & Wilkins Co. Baltimore MD. 1959. Price $

In reading this book one must remember that it is written by physiotherapists whose ideas may vary from current accepted medical practices in the United States. The intent of this book is to prepare the expectant mother for natural childbirth. which is defined as that state when both physical pain labor is physiological and unobstructed and in the mental pain that the obstetrical unafraid realizing the climax of the natural birth full conscious and independent and joyous. This volume therefore is published in the education of the physiotherapist who in England has gradually assumed the responsibility for the ante-natal education of the mother. All this notwithstanding it is true that the pregnant patient who is relaxed informed and has confidence in her attendant approaches labor and with hands to much better than the opposite type—the tense fearful medicated. All in all a worthwhile book. The book recommended for the midwife and the physiotherapist.

PETER BRYCE HUNTER, M.D.

THE TREATMENT OF DIABETES MELLITUS edited by *Elliott P. Joslin* A.M. M.D. Sc.D. *Howard F. Root* M.D. Hon. D.Sc. *Priscilla White* M.D. Sc.D. and *Alexander Marble* A.M. M.D. 10th edition 1000 pages illustrated. Lea & Febiger Philadelphia. 1959. Price $

The tenth edition of this classic book of diabetes has been completely revised and extended by the numerous references to the recent literature including all aspects of the knowledge which has accumulated fully the previous edition. The format has been changed the last edition to the chapter and the chapter has been rearranged into the chapter and the chapter has been rearranged into the chapter. The illustrations at the bottom of the page have been retained. Rudolph Bergen excellent chapter integrating the ad-

vances in ou kn wled f th hy ol gy f liab te- llit An impo ta t new c ept has been the de t t f lt t itl av for th utili a ti f gl cose-6-phosphat Th ph pl o-gl te- idati athway educed TPN (t iphosph py i li n cl tide) odu ct f thi athw y app a to be ti l fo th biosy thesi f f tty cl l Th ti dies b Dit l nd a soci t f tl e b lb co j ti a tl r h u e of th te eo copi li ecti g micro e h p l led n i po t t l ical thod f r tl l ti f asc lar di ense in th li b tic i c / e ti f t i l t i le and all e les av be ex pl l ed a p oced l t f i pos ible bec f the limit ti f m g ification n i th u e of th phtl lm c pe Dr White persi t in h t g convi ti th t f le h m n l the apy p ope ly gi i esse ti l t f the tr t ent f th g t d letic Dr Whit t a cli i l t d pted by th e lt f i l pe n e t by II say f tt itt l g th i t l r l jl f tl j il li b ti th gl th f fe l l rm es ti d ju ct t tl p th f bl u e bse ed i e f tl e p tient h ld timul te f th i tig ti by th li i i Th cl ajt on ge y a d li b tes t i good g l p ipl l t f the b efit f tl y ng r phy i n pecifi let led i f r tio t itl l i ll d g s h d t a types f t g y wo ll b telif l especi lly itl co il tio f h fa t me ge cy g y d ti f g y l ged pa t al fl ll the py d type f a e th i The ch te n no d ab ti melitu ia l es t i e tl the F i yn l me a ra di e e b t of i c e g i t est i ece t y rs i tl t dy f l t bul r f lts i re- ab pti Tl the f thi lle t b k f tl t th el by m y of pe i ce i the m a tl p editi ef l co t l f li b tes llit d t ated by g f ce i rm l blood ig a d nor l l leste ol ec i li hel th gh i t li ge t coo di n ti n f i lin dos g diet er a d ed enti p ll th best p og t gi tl e d b tic hi ch ce to li e y h ppy p od i t y a f ee f tl plicati f l i lise Thi book i ec m e ded t ll phy icia and hould b a qui ed by all m dic l lib ie

T MILLER, US F MC

THE CHEMISTRY WITHOUT TEARS By DR *P KI* MD DSC *M µ* C MD FRCP 86 pages illustrated Chu l C Th I bli l Sl i gfi ld Ill 19 0 Price $3 0

Th g l f th ll l t ted p es ti g t l l ed ty hi h all nti l d t ca l collected bl ed l y tl eo y l s ibl Tl i i l t l t ki g Th b k i u iqu i tl t ll i t f g i tal testing p es t l i collect Bec f t e l l t it t i y t l l al d hi h uld l li e gi f th b gi The tl f eq tly t t t l gi l l l fi l t t l l gi ig o l th t l k n l f k l li e Tl l i ll tl t tl li l l l itl f tl l ti t tl g t l l e se f ti f tl g th tl l m t ll l y h t l t h l t Th th t lly l l l tl l f l y rath th l yl g f l ti f l t l es li t Tl t k l e l l f tl i l ll l itl pe e l l gy p y l ps h l gy

E. PO S t A

Transplantation of Tissue Skin Cornea Fat Nerves Teeth Blood Vessel Endocrine Gland Organ Peritoneum Cancer Cell Vol II edited by *Lyndon F. Peer* M D with 12 contributors 690 pages illustrated William & Wilkins Co Baltimore Md 1959 Price $ 0

The second volume of Dr Peer work begins with introductory chapters reviewing cellular behavior and basic law of transplantation of tissue These and the chapters on skin cornea fat blood vessel endocrine gland and organ are especially rewarding The chapter on fat might well be labeled derma fat not only because the combined graft is recommended for use but also because the derma may well be the important constituent of the graft The book close with a chapter on tissue culture Where possible the chapters have been arranged to present the experiments on animal or their tissue separated from the investigations on human The closing paragraphs of each chapter are devoted to clinical applications that exist at our present state of knowledge Quite understandably beyond the scope of one man is a volume of this nature dealing as it does with a variety of tissue each tissue having a variety of facets to it study and the whole problem overcast by the complexities existent in the transplantation of tissue Dr Peer has enlisted the aid of 19 fellow contributors to accomplish this task many of whom are leading figures in their respective field such a Castroviejo Detering Hume Krohn Medawar and others The book is well presented and brings to the reader the current status of transplantation Known facts are stressed controversial points are acknowledged as such and lines along which fruitful research might be conducted are pointed out Both the clinician and the research worker interested in tissue transplantation will find this book of value Although a good portion of the book is devoted to historical and experimental background to any one interested this makes fascinating reading Moreover there are many practical surgical suggestions To those who would go deeper the available bibliography is extensive and the way is pointed to unsolved problems

CAPT J R CONNELLY MC USN

Synopsis of Treatment of Anorectal Diseases by *Stuart T Ross* M D F A C S F I C S 240 pages illustrated C V Mo by Co St Louis Mo 1959 Price $6 50

This is an admirable effort on the part of the author to present a manual of treatment that is devoid of any extraneous material Each subject is discussed briefly *with no theories statistics arguments* or bibliography It is therefore a book suited for the general practitioner and general surgeon as well as for the student and resident A short anatomic description with good diagrams is included with a presentation of common symptoms and methods of taking a history and performing protologic examination One chapter on the diagnosis treatment and pre- and postoperative care of hemorrhoids is extremely interesting and clearly put This should be of great value to military hospitals where hemorrhoidectomy is a frequent procedure Diagrams of positions and procedures are clear and simple and roentgenographic reproductions are well done Major surgical techniques have been omitted in order to preserve the simplicity and conciseness of this synopsis This reviewer would highly recommend that every busy general practitioner and general surgeon read this book several times

LT COL PHILIP A COX MC USAF

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MAJ WAR E E P TER MC US

SURGICAL SERVICE GUIDE by *Louis T Palumbo* M D M S F A C S 08 page illustrated Year Book Publisher Inc Chicago Ill 1959 Price $6

In this compact flexible covered pocket size volume the author has prepared a very useful publication on the fundamentals of diagnosis and management of many of the common surgical problems and conditions encountered in patients admitted to any hospital or service It represents the cumulative experience of the author and his associates over a period of many years This book has particular value for the intern and the junior surgical resident who must become conversant with the basic principles of anesthesia in order pertaining to the preoperative and postoperative management of the main surgical conditions complications thereof and the diagnostic procedures commonly performed Two chapters are devoted to follow up procedures and dietetics of special interest in general surgery In the appendix is a convenient table of specific agents used in cancer chemotherapy and one of normal blood chemistry values For the senior surgeon who devotes part of his time to teaching rounds this book provides a very convenient reference as a teaching guide Although there is a certain variance among surgeons as to individual preference on specific orders the author has presented conservative and time tested principles of management which are reliable and acceptable in most schools of surgery Orders and instructions are listed in a clear and concise manner Diagrams and illustrations are provided where essential for clarification Gastrointestinal surgery is well covered for the elective and emergency conditions Burns shock renal failure and cerebrocranial injuries are discussed briefly giving the basic essentials of management The complications of acute adrenal insufficiency diabetes cardiac arrest pulmonary atelectasis and results of incompatibility in blood transfusions are given special emphasis and discussion of their management The chapter on pediatric surgery covers the principles pediatric surgical conditions plus problems pertinent to fluid and electrolyte and other basic features Gynecology is covered in a very general way giving a few practical facts on examinations and tests This book should be included in every medical library of hospitals participating in postgraduate surgical training The general practitioner who does general surgery will find it a valuable and reliable guide The reasonable price the convenient size and binding of the book and the direct and understandable composition of the text make this a valuable investment for any surgical resident starting his career in surgery Most of the basic information contained herein will not be outdated for many years to come

COL ALAN B EAKER MC USA

ABNORMAL HAEMOGLOBINS A Symposium Organized by The Council for International Organizations of Medical Science Edited by *J H P Jonxis* and *J F Delafresnaye* 4? page illustrated Charles C Thomas Publisher Springfield Ill 1959 Price $9 50

During the week 15–21 September 195? the symposium on abnormal hemoglobins took place at Istanbul with participants from Europe Asia Africa and America This book contains the papers and the discussions of the meeting Nowadays the hemoglobin molecule is a lively area of investigation and the topic of discussion reflect the wide diversity of discipline brought to bear on the subject biochemistry genetics physiology anthropology and clinical medicine Since the time of the meeting there have been many important advances in the field but this book is an interesting milestone

LT COL WILLIAM H CROSBY MC USA

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